Ecological Assessment of EL31091

LITHIUM PLUS

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DOCUMENT CONTROL RECORD

Job	EZ22214
Document ID	222752-112
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DOCUMENT HISTORY

Rev	Reviewed by	Approved by	Date
1	Glen Ewers	Glen Ewers	28 August 2023
2	Glen Ewers	Glen Ewers	15 August 2024
3	Glen Ewers	Glen Ewers	20 August 2024

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RELIANCE, USES and LIMITATIONS

EXECUTIVE SUMMARY

Lithium Plus Minerals Ltd proposes to develop an underground lithium mine on Fog Bay Road, approximately 30 km south of Darwin within exploration lease 31091. To inform the environmental approvals that the project will require, Lithium Plus commissioned EcOz to undertake a terrestrial flora and fauna, with a focus on identifying threatened species and habitats and significant or sensitive vegetation types. Because the project footprint is yet to be finalised, a study area based on preliminary information from Lithium Plus focussing on the part of the EL that lies north of the Charlotte River was chosen.

Vegetation and land unit surveys identified ten land units within the study area, comprising mostly low hills and rises, supported by drainage systems and plains. With regards to significant vegetation types, the study area is transected by the Charlotte River in the south-west corner, which is lined by riparian vegetation and (immediately downstream of the study area) mangroves. Old-growth forest is also present**.**

The study area has had a high fire frequency, with all sites burnt in 2022, and some areas having very recent low intensity fire. The weeds Gamba Grass and Tully Grass were observed at low densities, with Stylo more prevalent. Feral animal presence – Feral Pigs, Feral Cats and Cattle – was observed during field surveys and remote-sensing camera trapping.

Targeted field surveys within a portion of study area indicated that two possible threatened flora species – Darwin Cycad (*Cycas armstrongii*) and *Typhonium praetermissum* – are not present.

Two threatened fauna species were detected within the study area during targeted camera trapping – Northern Brushtail Possum and the Black-footed Tree-rat.

Four threatened fauna species that were not detected should still be considered as having a reasonable chance of being present– perhaps only occasionally – within the study area. These are the Bare-rumped Sheath-tail Bat, which could roost in any large, hollow-bearing trees; Mitchell's Water Monitor in the mangroves downstream of the Charlotte River, and also in the riparian habitat within the study area; Mertens' Water Monitor in the same riparian habitat; and the Partridge Pigeon in savanna woodland.

Because there are many recent records of Partridge Pigeon in the region, the presence of this species within the project area is not likely to be considered significant. Likewise for Mitchell's and Mertens' Water Monitor, and Bare-rumped Sheath-tailed Bat; the very small area of suitable habitat proximate to the study area – in comparison with the very large area of habitat in the region – means that their presence within the project area is not likely to be considered significant.

In contrast, the records within the study area of the Northern Brushtail Possum and the Black-footed Tree-rat are more significant. The majority of recent records of these species in the NT are from the Darwin rural area, where it is posited the species is protected from the higher rates of burning that are occurring across much of the species' range. Consequently, the occurrence of these species within the study area could be considered to be a key source population for breeding or dispersal. It is recommended that a survey of optimum habitat in the region of the study area be undertaken to contextualise the records of the Northern Brushtail Possum and the Black-footed Tree-rat from this survey, and thereby inform a significant impact assessment.

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1 INTRODUCTION

Lithium Plus Minerals Ltd (Lithium Plus) proposes to develop an underground lithium mine on Fog Bay Road, approximately 30 km south of Darwin (see Figure 1-1) within exploration lease (EL) 31091.

To inform the environmental approvals that the project will require, Lithium Plus commissioned EcOz to undertake a terrestrial flora and fauna, with a focus on identifying threatened species and habitats, and significant or sensitive vegetation types. The results of this study can be used to inform mine planning and design, with priority placed on avoiding impacts to significant species and habitats wherever possible.

The project footprint is yet to be finalised, and so based on preliminary information from Lithium Plus about the likely footprint, a study area focussing on the part of the EL that lies north of the Charlotte River has been chosen – see Figure 1-1. However, initial information provided by Lithium Plus showed a smaller footprint in the western zone of the study area. As a result, the vegetation and land unit survey was focussed in that western area. The desktop assessment and remote-sensing camera trapping survey were carried out across the whole study area.

To address the scope, this report presents:

- A desktop review of the existing environment.
- Land unit mapping of the study area to an approximate scale of 1:25,000.
- Identification of significant vegetation communities for the study area.
- A 'likelihood of occurrence' assessment using desktop information to determine which threatened species have a reasonable likelihood of occurring within the study area.
- The methods and results of targeted threatened species surveys within the study area to identify the presence (or likely presence) of threatened species.
- A qualitative assessment of the significance of threatened species identified as occurring (or likely to occur) within the study area.

This report does not assess whether the development will have a significant impact on any threatened species.

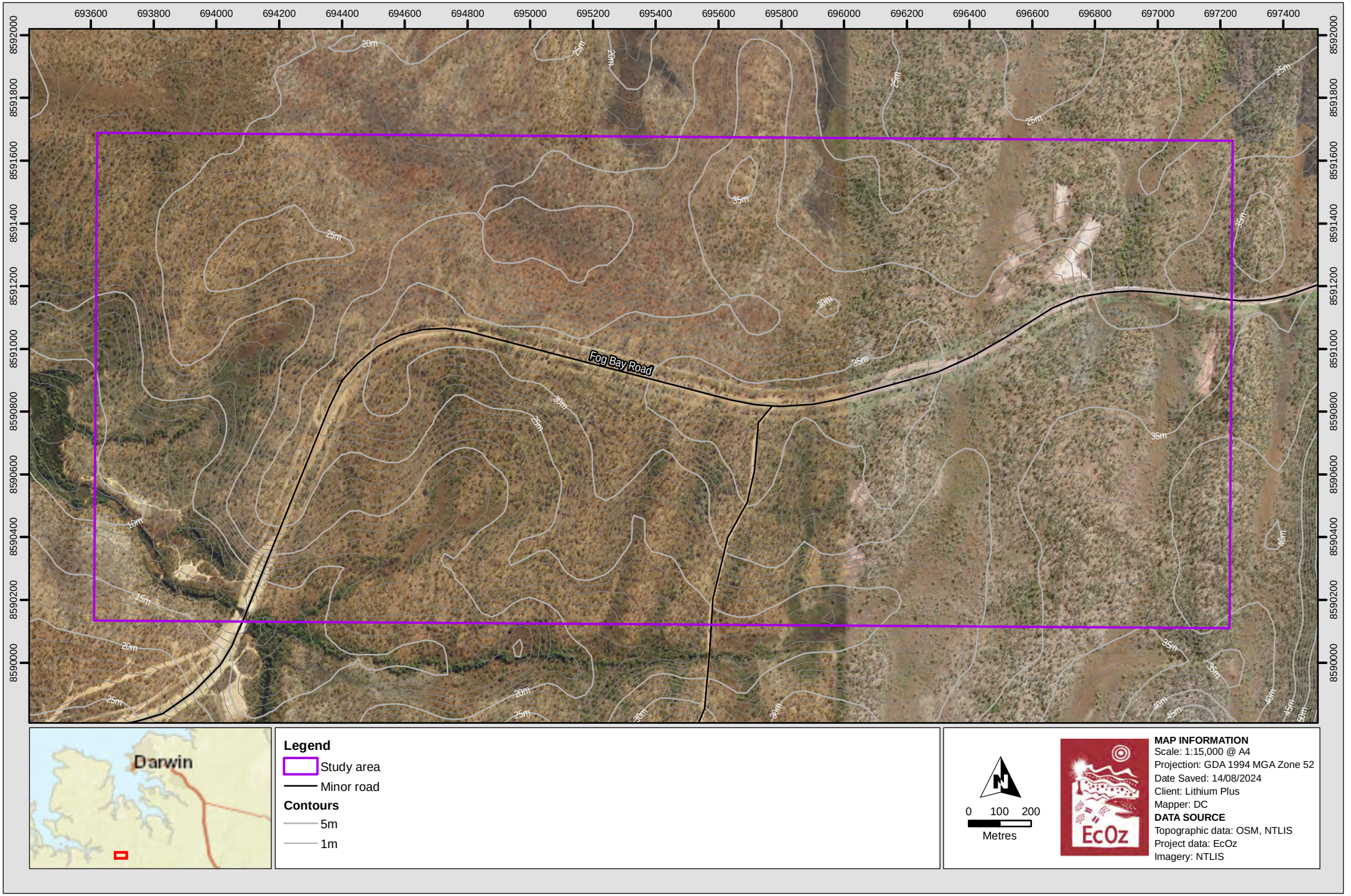

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Figure 1-1. Map of the study area

2 ENVIRONMENTAL CONTEXT

The existing environmental values within the study area are described in this section. This information will be used as a basis for the design of the ecological surveys discussed in Sections 3, 4 and 5. The information for this section comes from desktop databases and reports.

2.1 Overview

The study area is currently titled exploration lease (EL) 31091. Prior to this, the study area had been under other mineral titles, but shows no signs of previous disturbance apart from exploration by Lithium Plus.

Fog Bay Road intersects the northern section of the study area. Charlotte River and its tributaries flow from south to north through EL31091. This third-order watercourse starts approximately 9 km upstream of EL31091 at Mount Peel and flows into the Bynoe Harbour approximately 8 km downstream of EL31091. It retains pools of water throughout the dry season.

The study area does not occur within any national parks or reserves. The nearest is the Blackmore River Conservation Reserve, 25 km east of the study area (DEPWS 2000c). The study area does not occur within any Sites of Conservation Significance (SOCS) or nationally-important wetlands, nor does water from the study area flow into any of these areas.

Land systems – i.e. 'an area or group of areas throughout which there is a recurring pattern of topography, soils and vegetation' (Christian and Stewart 1968) – have been mapped in the region by the NT Government at a scale of 1:250,000. This mapping shows that the study area intersects two land systems (described in Table 2-1) – predominantly the sandstone plains and rises of the Bustard land system, with the hillier landforms associated with the Baker landform to the east and south-central.

Table 2-1. Summary of the land systems relevant to the study area

Land system	Landform	Soil	Vegetation
Sandstone hills			
Baker	Rugged hills and strike ridges with intervening narrow valleys and short lower slopes on folded sandstone and siltstone	Skeletal soils and outcrop with minor sandy red and yellow gradational soils	Mid-high woodland of *Corymbia dichromophloia, Eucalyptus miniata*, *C. bleeseri*, E. tectifica and *C. terminalis* over *Sorghum* species, *Themeda triandra* and *Chrysopogon* species
Sandstone plains and rises			
Bustard	Very low ridges and hills on Lower Proterozoic sediment and intervening alluvial flats	Lithosols with minor shallow yellow massive earths and earthy sands	Low shrubland of *Eucalyptus* species, *Xanthostemon paradoxus* and *Buchanania* species

2.2 Threatened species

This section outlines the procedure and results of the threatened species 'likelihood of occurrence' assessment conducted for this report. The assessment was undertaken using available desktop information, as well as databases of existing records and potential species. The purpose of this assessment was to determine which threatened species have the potential to occur in the study area. This process facilitates the identification of those species which may need to be included within the project's risk assessment and those which can be reasonably excluded from further consideration because they are unlikely to occur within the study area.

Note: This process is not a risk assessment as it does not consider project activities and their potential impacts.

This report focusses on species that are listed as Vulnerable (VU), Endangered (EN) or Critically Endangered (CR) under the NT *Territory Parks and Wildlife Conservation Act* (*TPWC Act*) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*).

The following procedure was used to determine which threatened species have the potential to occur in the study area:

- Species records from the latest version of the NT Atlas were clipped to the Darwin Coastal bioregion. Bioregions give a broad area with largely similar habitat characteristics and species assemblages. Clipping data to them ensures all potential species are captured in order to undertake a study-specific 'likelihood of occurrence' assessment.
- EPBC Protected Matters Search Tool (PMST) was used to generate a report using a 50km buffer from the study area. This PMST is an online enquiry tool managed by the Commonwealth Department of the Environment and Energy which interrogates a range of existing flora and fauna data, as well as predictive modelling to speculate on the presence of species within a search area. The PMST uses a grid system to determine which protected matters it encapsulates for a particular search. The PMST report (Appendix A) was generated in May 2023 (and updated in August 2024).
- For each threatened species, the likelihood of it occurring within the study area was then assessed based on desktop information that relates to habitat requirements, distribution, number and dates of proximate records (obtained from NT Atlas and/or Atlas of Living Australia), and the ecological information described in Section 2. Likelihood ratings are defined in Table 2-2.

Table 2-2. Ratings for the desktop threatened species likelihood of occurrence assessment

Rating	Definition
HIGH	It is expected that this species occurs within the study area because there is core habitat and recent (post-2000) proximate records or knowledge that the species occurs in the local area.
MEDIUM	Species may occur within the study area because there is suitable habitat; however, there is evidence that lowers its likelihood of occurrence (known range contraction of the species in the region, no recent records within or close to the study area, substantial loss of habitat within the study area since previous records, species is naturally-rare or occurs at a low density etc.).
LOW	Species may occur, as a vagrant, within the study area; only marginally suitable habitat is expected.
NONE	There is strong evidence that this species will not occur within study area (i.e., there is no suitable habitat and/or the species is considered to be regionally extinct).

A total of 58 threatened species were considered in the 'likelihood of occurrence' assessment. The results from the threatened species 'likelihood of occurrence' assessment are detailed in Appendix C[1], presented in Table 2-3, and summarised as follows:

- Five threatened fauna species have a high likelihood of occurring.
- Two threatened flora species and two threatened fauna species were identified to have a medium likelihood of occurring
- The remaining threatened species have a low or no likelihood of occurring.

The species listed as high or medium likelihood are the focus for further assessment.

Table 2-3. Desktop assessment of threatened species with a moderate or high likelihood of occurring in the study area

Likelihood	Species	Class	Habitat type	Status	
				EPBC	TPWC
HIGH	Partridge Pigeon (eastern subspecies) (*Geophaps smithii smithii)*	Bird	Open woodland	VU	VU
	Black-footed Tree-rat (Kimberley and mainland NT subspecies) *(Mesembriomys gouldii gouldii)*	Mammal	Woodland and drainage areas	EN	VU
	Northern Brushtail Possum *(Trichosurus vulpecula arnhemensis)*		Open forest	VU	-
	Mitchell's Water Monitor (*Varanus mitchelli)*	Reptile	Edges Charlotte River (and downstream mangroves, for Mitchell's)	CR	VU
	Mertens' Water Monitor (*Varanus mertensi)*			EN	VU
MEDIUM	Bare-rumped Sheath-tailed Bat (*Saccolaimus saccolaimus (nudicluniatus*))	Mammal	Roosts in large hollow-bearing trees in woodland. Forages in broad range of habitats.	VU	-
	Northern Blue-tongued Skink (*Tiliqua scincoides intermedia*)	Reptile	Within shaded, cool and moist microhabitats in a variety of Top End habitats	CR	-
	Darwin Cycad (*Cycas armstrongii*)	Plant	Open woodland	-	VU
	Typhonium praetermissum		Open woodland	-	VU

CR = Critically Endangered; EN = Endangered; VU = Vulnerable

[1] Note that Appendix B has been updated to represent the final threatened species likelihood of occurrence presented in Section 6.

Partridge Pigeon

The eastern sub-species of Partridge Pigeon (*Geophaps smithii smithii*) occurs across the Top End and the Kimberley; however, it has declined or disappeared from much of the lower rainfall parts of this range over the last century (Woinarski 2006). The species is largely sedentary; however, individuals can travel distances of 5 to 10 km in the Wet season in search of food and water resources (Woinarski 2006). Home ranges vary seasonally between 8 and 31 hectares (Fraser 2001). It is primarily found in open forest and woodland dominated by *Eucalyptus tetrodonta* and *E. miniata* that has a structurally diverse understory (DEWHA 2010). According to Fraser (2001), the Partridge Pigeon favours a structurally-patchy savanna understorey at a relatively intricate scale. In all seasons, the species prefers to feed in areas that have an open ground layer (e.g. following fire); however, they are more likely to nest at sites where there is high vegetation cover. These vegetated areas are also often used as roost sites and when retreating from disturbance.

The major threat to the Partridge Pigeon is change in fire regime to one where fires extend over large areas and the mosaic of fire ages is erased (Fraser et al. 2003; Garnett et al. 2011). Associated with larger, more intense fires is an increase in predation pressure by feral cats following the reduction in habitat cover (Woinarski 2004). Furthermore, the species is threatened by the invasion of exotic pasture grasses, such as Gamba Grass (*Andropogon gayanus*), which then provide greater fuel loads and promote large fires that further change the natural vegetation structure (Garnett et al. 2011).

The most recent known proximate targeted surveys for the Partridge Pigeon were completed by EcOz in 2022 at ML1148 and in 2021 on Blackmore Peninsula, both approximately 20 km (at their closest points) west and east of study area, respectively. The methodology employed for those surveys was similar to that used for this survey, apart from the use of a two-camera array for each camera trapping site (instead of three) at Blackmore. The species was detected at both sites. There are records from 1996 to the north of the study area, and an undated record approximately 3 km to the south-east – see Figure 5-7.

Black-footed Tree-rat

The Kimberley and mainland Northern Territory sub-species of the Black-footed Tree-rat (*Mesembriomys gouldii gouldii*) is listed as Endangered under the *EPBC Act* and the *TPWC Act*. It is a medium-sized nocturnal rodent that dens mostly in tree hollows but may also use clumps of *Pandanus spiralis*. The species is largely arboreal but also forages on the ground. The Black-footed Tree-rat generally requires fruit and seed resources – including *Pandanus* fruits, fruiting trees and shrubs (Rankmore 2006). The Black-footed Tree-rat predominantly occurs in woodlands and lowland open forests dominated by large *Darwin Woollybutt (Eucalyptus miniata) and Darwin Stringybark (Eucalyptus tetrodonta)* trees with a moderately dense and diverse mid-storey of small trees and shrubs (DEPWS 2021c). Black-footed Tree-rats have a large home range (~67 ha) and can travel over two kilometres in a night (Rankmore & Friend 2008).

This sub-species is thought to be more prevalent in woodlands with infrequent and low intensity fires (Price & Baker 2005) with greater fruiting species diversity to support a greater abundance of individuals (Rankmore 2006). Tree hollows are an important resource for the species and frequently burnt landscapes may contain fewer larger trees that provide hollows; however, natural events such as cyclones may also reduce the number of trees and hence hollow availability (Woinarski & Westaway 2008). This species does not use highly modified habitat and requires forested corridors connecting remnant patches of intact woodland larger than 1 ha in size (Rankmore & Price 2004).

The main drivers of decline for this species are related to inappropriate fire regimes that degrades habitat values, habitat clearing and fragmentation due to changes in land use and predation by feral cats (Hill 2020). Based on EcOz survey experience, Black-footed Tree-rats have remained relatively abundant in some parts of the Darwin area where they have access to suitable nesting habitat and food resources. Elsewhere – such as at Gunn Point, Litchfield, Kakadu, and in the Kimberley – recent surveys have yielded far fewer records of the species than previously, indicating severe species decline in these areas (TSSC 2015). The continuing decline of this species means that all known populations and habitat supporting them is considered important and should be protected wherever possible (Stokeld et al. 2020).

The most recent known proximate targeted surveys for the Black-footed Tree-rat were completed by EcOz in 2022 at ML1148 and in 2021 on Blackmore Peninsula, both approximately 20 km (at its closest) from the study area. The species was detected at both sites – see Figure 5-7 and Section 5.2.2 for more detail.

Bare-rumped Sheath-tailed Bat

Listed as Vulnerable under the EPBC Act, but not listed under the TPWC Act, the Bare-rumped Sheathtail Bat (*Saccolaimus saccolaimus nudicluniatus)* is a high-flying insectivorous bat species that occurs as ywo geographically-isolated populations in northern Australia:

- A north-eastern Queensland population within a relatively narrow range on the eastern side of Cape York in Queensland between Lockhart River to just south of Townsville
- A western population and extending throughout the Kimberley region of Western Australia, areas of the Victoria Bonaparte bioregion, the north-western part of the Top End of the Northern Territory and reaching into the coastal areas of the western part of the Gulf of Carpentaria to Roper River (Armstrong et al. 2021; McKenzie et al. 2018).

Genetic analysis by Milne et al. (2009) provided support that the two population isolates of *Saccolaimus saccolaimus* were part of the same species.

There have been relatively few records of Bare-rumped Sheathtail Bats across this broad distribution. The species is difficult to capture because of its tendency to fly high (Armstrong et al. 2021). Only recently have ecologists been able to develop the means to unambiguously identify it from echolocation calls, and in the Queensland part of its range it can still be difficult to distinguish from closely related species (Armstrong et al. 2021; McKenzie and Bullen 2018; Woinarski et al. 2014). Based on collected voucher specimens and verified calls, Bare-rumped Sheathtail Bats have been recorded at only 10 locations within the NT.

Bare-rumped Sheathtail Bats forage above the tree canopy (McKenzie and Bullen 2018). In Queensland, the species is known to forage in coastal lowland rainforests, as well as more open Eucalyptus or Corymbia forests interspersed with such rainforest. Based on the types of habitats within which specimens have been recorded in the NT, suitable habitat for the western population is much broader – as suggested from the collection of specimens up to approximately 145 km from the coast in the NT (Milne et al. 2009), and even further inland in the Kimberley (McKenzie et al. 2018). In the NT, Bare-rumped Sheathtail Bat specimens have been collected from *Pandanus* woodland fringing sedgelands and Eucalyptus tall open forests (Churchill 2008; Friend and Braithwaite 1986).

All confirmed roosting sites for the Bare-rumped Sheathtail Bat have been in *Eucalyptus miniata, Eucalyptus tetrodonta* and *Eucalyptus platyphylla* (Schulz and Thomson 2007), as well as large Melaleuca species (Armstrong et al. 2021). The species roosts in groups of 10 to 100 individuals in large trees generally characterised by broken tree trunks, large branches (Murphy 2001; Armstrong et al. 2021) and deep hollow pipes more than 18 cm in diameter with hollow entrances more than 6 m from the ground (Churchill 2008). Armstrong et al. (2021) notes that ‘given the widespread nature of these Eucalypt woodlands and forests across parts of northern Australia, potential for roosting appears to be high...’.

The most severe threat to Bare-rumped Sheathtail Bats is habitat loss and fragmentation – in particular the loss of roost trees (Woinarski et al. 2014).

All remnant vegetation – and possibly even cleared areas – in the region constitute foraging habitat for the Bare-rumped Sheathtail Bat. Roosting habitat is likely limited to old-growth forest with trees supporting hollows. The nearest records to the study area are from Middle Arm Peninsula in 2019.

Northern Brushtail Possum

The north-western sub-species of the Brushtail Possum (*Trichosurus vulpecula arnhemensis*) is listed as Vulnerable under the *EPBC Act*. A nocturnal semi-arboreal marsupial, this sub-species occurs discontinuously from the Gulf of Carpentaria hinterland near Borroloola, in the Northern Territory, to the Kimberley, in Western Australia (Morris et al. 2016). The Northern Brushtail Possum mainly inhabits tall eucalypt open forests and

woodlands with large hollow-bearing trees, particularly where the understorey contains shrubs that bear fleshy fruits, but also occurs in mangrove communities (especially where these contain hollow-bearing trees), rainforests and semi-urban areas (notably around Darwin) (TSSC 2021). Northern Brushtail Possum abundance is associated with high shrub density (Stobo-Wilson et al. 2019).

The broadscale decline of the subspecies' populations in Australia's Top End and reduction of its home range across the Northern Territory – an estimated 72 % decrease in the species' historical geographic range in north-western Australia between 1993 and 2019 – is largely attributed to frequent extensive fires (which reduce shelter sites and shrub density, thereby increasing risk of feral cat predation), as well as habitat modification from invasive grasses, namely Gamba Grass (*Andropogon gayanus*) and Mission Grass (*Cenchrus polystachios)* (Stobo-Wilson et al. 2019; TSSC 2021).

The most recent known proximate targeted surveys for the Northern Brushtail Possum were completed by EcOz in 2022 at ML1148 and in 2021 on Blackmore Peninsula, both approximately 20 km (at its closest) from the study area. The species was detected at both sites – see Section 5.2.3 and Figure 5-7 for more detail.

Mitchell's Water Monitor

Mitchell's Water Monitor (*Varanus mitchelli*) is a diurnal, semi-aquatic and arboreal medium-sized monitor listed as Vulnerable under the *TPWC Act* and as Critically Endangered under the *EPBC Act*. In the NT, the distribution of the species includes the catchments of all rivers flowing to the Timor Sea, Arafura Sea and the Gulf of Carpentaria, with isolated occurrence in north-western Queensland (DEPWS 2021e).

Mitchell's Water Monitor shelters in tree hollows or under bark and inhabits margins of *Pandanus*-lined watercourses, swamps and lagoons in Northern Australia (DEPWS 2021e). Found close to watercourses, this species basks on overhanging vegetation and submerges into water when approached (Swanson 2007).

Mitchell's Water Monitor numbers have severely declined because of the spread of Cane Toads and the high susceptibility of monitors to their toxin; however, there does not appear to be a range contraction for this species since there are still many recent records across its historic distribution (DEPWS 2021e).

Although there are no nearby records of this species, de Laive et al. (2021) argue that the ecological niche occupied by Mitchell's Water Monitor is broader than currently recognised and that the species should be considered as potentially occurring in most mangrove habitats across their known range. There are records of Mitchell's Water Monitor living in mangroves around the Darwin Harbour region, including from 2020 on Middle Arm Peninsula. As such, this species should be considered likely to occur in the vicinity of the Charolotte River and adjoining mangroves.

Mertens' Water Monitor

The Mertens' Water Monitor (*Varanus mertensi*) is listed as Vulnerable under the *TPWC Act* and Endangered under the *EPBC Act*. A moderately large, semi-aquatic and arboreal monitor, this species forages extensively in freshwater. A flexible diet enables the species to adapt to seasonal and spatial differences in prey availability throughout its broad distribution, occurring in coastal and inland waters across northern Australia, from the Kimberley, in Western Australia, to the western side of Cape York Peninsula in Queensland. (Christian 2004; DEPWS 2024b). Within the NT, records span across most of the Top End and Gulf Region (DEPWS 2024b).

A strong swimmer seldom seen far from waterbodies, Mertens' Water Monitor occupies a range of natural and unnatural freshwater bodies (Mayes et al. 2005; Wilson & Swan 2017).

Cane Toads, the greatest threat to this species, are now present across its entire NT distribution. Mertens' Water Monitor is highly susceptible to Cane Toad toxin (DEPWS 2024b). Given the inability to prevent localised declines once Cane Toads establish, conservation effort is best directed to maintaining Mertens' Water Monitor numbers in toad-invaded areas (DEPWS 2024b).

There are only a few records of Mertens' Water Monitor for the region, but notably one of those is an incidental record upstream of the Charlotte River during the ecology survey undertaken in 2024 to contextualise the

findings of this report by EcOz. This species should be considered likely to occur anywhere in the vicinity of the Charolotte River

Northern Blue-tongued Skink

The Northern Blue-tongued Skink (*Tiliqua scincoides intermedia*) is listed as Critically Endangered under the EPBC Act. It is not listed under the TPWC Act. This species is a large, ground-dwelling, short-limbed skink that occurs in a variety of habitats (riparian forest, vine thicket/monsoon rainforest, pandanus-lined gorges, Melaleuca forest, Eucalypt woodland, shrublands, and dense grasslands) across the wet-dry tropics of northern Australia from the Kimberley to North-western Queensland. Many records of this species have occurred in close association with seasonal or permanent water (Shea 1992; AWC unpublished data; DAC unpublished data; WAC unpublished data – all referenced in DCCEEW 2023) where they are reliant upon dense shrubs and grasses, deep leaf litter, burrows, and under built structures and discarded household items for shelter. These areas with dense understorey vegetation, and cool and shady microhabitats are critical to the survival of this species and provide resources such as food, water, and protection from environmental exposure and predation (DCCEEW 2023).

Historically, the Northern Blue-tongue Skink was common across various habitats in the Top End, and it was frequently observed around suburban Darwin. However, recent research has identified a significant decline in its population, associated with the fatal ingestion of toxic Cane Toads (Jolly et al. 2023, Price-Rees et al. 2010). Other threats such as pest animals (including predation by cats), fire, habitat destruction and degradation, illegal collection for the pet trade and traditional hunting are also listed as threats to this species (DCCEEW 2023). The nearest record of this species to the study area is ~14 km to the east at the base of Blackmore Peninsula.

Darwin Cycad

A previous desktop report from the study area indicated Darwin Cycad (*Cycas armstrongii*) – listed as Vulnerable under the TPWC Act – could occur in the study area. Darwin Cycads are endemic to the Top End; occurring from Gunn Point to Hayes Creek, west to within 50 km of the coastline and east to the Wildman River catchment (Kerrigan et al. 2021). This species also occurs on the Tiwi Islands and Cobourg Peninsula. Thus, Darwin Cycads are typically found east of the study area, with the most proximate record in NT Atlas 12 km north-east of the EL from 2017. Another cycad species known to occur in the area is *Cycas maconochiei,* which is not listed as a threatened species. A survey by EcOz report in 2017 for Grants Project, approximately 10 km north-west of the study area, only recorded *Cycas maconochiei*. Nevertheless, it was considered possible that Darwin Cycad, *Cycas maconochiei* or a hybrid of the two species could be found in the study area.

With a slender trunk, Darwin Cycad it is one of the smallest *Cycas* species in the NT. The species occurs in open grassy woodlands where adequate draining appears to be a limiting factor and also occurs on rocky outcrops, undulating hills and plains (Kerrigan et al. 2012; Liddle 2009). Prime cycad habitat contains deep loamy, well-drained soil and the species is frequently associated with *Eucalyptus miniata* and *Eucalyptus tetrodonta* savannah woodland habitat (Liddle 2009).

Typhonium praetermissum

Typhonium praetermissum is listed as Vulnerable under the *TPWC Act*. It is a small perennial herb with above ground parts present during the annual wet season after onset of favourable rain. This species occurs in open woodland and favours relatively unshaded areas in red brown clay and shallow gravelly soils. *Typhonium praetermissum* plants are typically found in small, relatively open (unshaded) patches of gravel or gravelly sandy substrate supporting less than 20% vegetation ground cover, and located on the edge of lateritic plateau areas (NTH 2020).

The species is endemic to the greater Darwin region, extending from the Gunn Point area, south to Lake Bennett and west to Cox Peninsula. The NT Government has developed a habitat model for *Typhonium praetermissum* for the Greater Darwin region (Cuff & Green 2019), which indicates the presence of high

likelihood habitat within the study area (see Section 4.2). However, the nearest records of this relatively well-surveyed species are 15 km to the east and west of the study area.

Habitat loss due to clearing for residential expansion and rural subdivision presents a major threat to this species. Additional threats include the spread of introduced perennial grass species – such as Gamba Grass and Mission Grass – which are known to hinder recruitment of native herbaceous flora and increase fuel loads resulting in more intense fires that can reduce habitat quality for this species. Digging and foraging by feral animals such as Feral Pigs may also negatively impact on this species.

2.3 Migratory species

Australia is a signatory to three bilateral migratory bird agreements with Japan, China and the Republic of Korea. Species listed on the annexes to these agreements are a Matter of National Environmental Significance under the *EPBC Act* as listed migratory species.

The EPBC Protected Matters Search Tool report (see Appendix A) identified the possibility of migratory species protected under international agreements occurring within the region. However, most of these migratory species have a low likelihood of occurring within the study area. Many of the birds listed within the report are wetland species and/or occur almost exclusively in coastal and estuarine environments. For these species, and marine species, this study area does not contain suitable habitat, and so they are not considered further.

The remaining migratory species could occur within the terrestrial or freshwater ecosystems within the study area. However, even if individual members of some migratory species were to seasonally utilise habitat within the study area, this occurrence is expected to be for a short period and in low abundances. Additionally, any migratory species utilising habitat within the study area could reasonably be expected to utilise the areas of similar habitat in the region. As such, the habitat within the study area is not considered to be important habitat for any migratory species.

3 VEGETATION AND LAND UNIT SURVEY

A land unit is a reasonably homogenous part of a land surface, distinct from surrounding terrain with consistent properties in landform, soil, and vegetation (Jessop & King 1997). As such, each land unit has a characteristic pattern on aerial imagery. These are at a significantly smaller scale than a land system (i.e. land systems constitute many different land units). Their scale is useful for identifying habitat features that may support threatened species and sensitive vegetation types.

In this report, land units will be used for the basis of the threatened species 'likelihood of occurrence' assessment. Land units provide a finer level of detail than other types of regional mapping data, such as National Vegetation Information System.

3.1 Methods

Satellite imagery, available land resource datasets and field survey results were collectively used to verify land units relevant to the study area, and refined to a scale of 1:10,000. To inform survey sites for vegetation assessment, existing land units mapped for the Elizabeth, Darwin and Blackmore Rivers (Fogarty et al. 1984) and the Lower Finnis region (Hill et al. 2002) were used.

As explained in Section 1, initial information provided by Lithium Plus showed a smaller footprint in the western zone of the study area. As a result, the vegetation and land unit survey was limited to that smaller area (refer to Figure 3-1).

Field assessments were undertaken on 21 and 22 December by botanist Anna Lemon and EcOz Lead Consultant Suzanne Barber. Data collected at survey sites were based on methods used by Brocklehurst et al. (2008). Two levels of survey sites were undertaken (within a 20 x 20 m quadrat):

- Vegetation sites (comprehensive assessment) – provide a detailed description of the landform, vegetation, and soil. Information on landform, soil type (surface examination only), vegetation structure, vegetation description, dominant flora species within each stratum (including height range, average height, and percent cover) and all other flora species was collected.
- Check sites (rapid assessment) – used to quickly record habitat unit details. These sites are important reference points for post-field trip revision of final land unit boundaries. Information on landform, soil type (surface examination only), vegetation structure, vegetation description and dominant flora species within each stratum was collected.

A total of 18 sites (Appendix A) were assessed across the western portion of the study area. Within this area, 14 sites were sampled comprising of seven vegetation sites and seven check sites. The remaining four sites were assessed along the Charlotte River, situated to the south-west. These sites comprised of two vegetation sites, one check site and one photo site.

3.2 Results

Ten land units are mapped as occurring within the study area supporting mostly low hills and rises across the study area, and to a lesser extent, drainage systems and plains. These are summarised in Table 3-1, and their extents mapped in Figure 3-1.

The dominant landform within the study area are rises supporting the land units 2a1 (~256.1 ha), 2b1 and 2b2 (~23.3 ha) with 2a1 being the most widespread. These comprise of gentle rises and side-slopes supporting open eucalypt woodland. Land unit 1b (~113.9 ha) comprises steep ridges supporting mixed Eucalypt woodland habitat and occurs within the broader study area to the east. Land unit 5b1 (~68.6 ha) supports drainage systems typically occurring within upland terrains (between low hills and rises) and supports a mixed species open forest. Land units 3e (33 ha) and 4c (24.4 ha) comprise plains, respectively supporting Eucalypt woodland and open forest habitats. Land unit 3e occurs towards the centre of the study area and north of Fog Bay Road, while 4c occurs to the west near the Charlotte River.

Most of the area surveyed contained the vegetation and landforms described within available land unit datasets, with some minor adjustments made to spatial boundaries to accurately reflect survey results. Seven sites were surveyed within land unit 2a1, four sites were assessed within land unit 4c, and three sites were assessed within land unit 5b1. All sites contained similar landforms and vegetation communities to those described within available datasets.

Land unit 2a1 comprised of mid open woodlands (occasional woodland) with *Eucalyptus miniata* and *Eucalyptus tetrodonta*, occasionally with *Erythrophleum chlorostachys* and *Corymbia bleeseri*. The mid stratum most comprised low open woodlands with juvenile *Eucalyptus* spp., *Erythrophleum chlorostachys* and *Livistona humilis*. The ground stratum comprised of open tussock grassland with *Heteropogon triticeus*, *Eriachne ciliata*, Annual *Sorghum* sp. and occasionally *Alloteropsis semialata*. Landform typically comprised of rises throughout and surface soils were typically gravelly brown or yellow-brown sandy clay loams.

Land unit 4c comprised of low-mid open woodland comprised of *Erythrophleum chlorostachys* and mixed *Eucalyptus* and/or *Corymbia* species. The mid stratum comprised of sparse open shrubland supporting *Livistona humilis*, *Petalostigma pubescens*, *Pandanus spiralis* and *Grevillea pteridifolia*. The ground stratum comprised of tussock grasslands supporting Annual *Sorghum* sp., *Sorghum plumosum*, *Heteropogon triticeus* and *Eriachne ciliata*. Throughout the survey area, landform comprised of gentle lower slopes and surface soils were typically brown, grey or yellow-brown sandy clays.

Land unit 5b1 comprised of low-mid open woodland comprised of a mix of overstorey species, including *Eucalyptus* and/or *Corymbia* species, *Erythrophleum chlorostachys* and *Lophostemon lactifluus*. The mid

stratum comprised of open shrubland supporting *Lophostemon lactifluus*, *Grevillea pteridifolia Pandanus spiralis* and *Livistona humilis*. The ground stratum typically comprised of closed tussock grassland dominated with Annual *Sorghum* sp. interspersed with other grass species, and a mix of forbs and sedges. Landform comprised of drainage systems within upland terrains (rises) and surface soils were typically dark grey-brown clay loams.

Although land units were not available for the section of the Charlotte River that was surveyed, data collected during the riparian assessment indicates that vegetation and landform descriptions for land units 9a, 9b and 10e1 align with field observations. Vegetation observed at these sites comprised a mix of riparian vegetation and those associated with mangrove assemblages. Riparian tributaries to the Charlotte River typically supported *Melaleuca spp.* and *Acacia auriculiformis* woodland-open forest, over *Ceriops tagal*, *Diospyros* sp., +/- *Hibiscus tiliaceus* and *Thespesia populneoides* shrubland. The ground stratum consisted of open tussock grassland with *Germania grandiflora* and Annual *Sorghum* sp., +/- *Crinum angustifolia* and *Acrostichum speciosum*. Mangrove assemblages were also present with low closed forests of *Ceriops tagal* observed along the Charlotte River. These assemblages were observed at CR02, CR03 and CR04. At CR01, *Ceriops tagal* was typically restricted to the riverbank.

Table 3-1. Desktop land units relevant to the study area

Land unit	Landform Description	Soil	Vegetation	Project relevance
10e1	River systems (steep banks); Rock outcrop on banks	Hydrosols; very poorly drained	Tall woodland or tall open forest of *Acacia auriculiformis, Melaleuca leucadendra* over *Aristida* spp., *Eriachne* spp.	The Charlotte River, south-west corner of the study area
1b	Steep ridges 10 - 40% Nil to low level of seasonal soil waterlogging	Rudosols	Woodland with *Eucalyptus miniata*, *E. tectifica*, *C. foelscheana* over *Sorghum plumosum*.	Broader study area
2a1	Rises to 4% Nil to low level of seasonal soil waterlogging	Leptic rudosols	Open woodland (minor woodland) with *Eucalyptus miniata*, *E. tetrodonta*, or *Corymbia foelscheana*, *C. confertiflora*, *E. tectifica* over mixed grasses.	Widespread across much of the project footprint, intersects proposed infrastructure
2b2	Sideslopes 2 - 5% Nil to low level of seasonal soil waterlogging	Brown kandosols	Low open woodland of mixed species, *Eucalyptus miniata*, *E. tetrodonta* over sparse grasses.	Broader study area
3e	Flat to gently undulating upland surface, slope 0.5 – 2% Moderate to high level of seasonal soil waterlogging	Kandosolic redoxic hydrosols	Woodland of *Corymbia polycarpa*, *Erythrophleum chlorostachys* over mixed grasses; wet season water table	Intersects proposed infrastructure
4c	Plains, gentle lower slopes, slope 0.5 - 1.5% Moderate to high level of seasonal soil waterlogging	Kandosolic redoxic hydrosols	Open forest of *Eucalyptus* spp. over mixed grasses; wet season watertable.	Intersects proposed infrastructure

Land unit	Landform Description	Soil	Vegetation	Project relevance
5a	Narrow upland alluvial plains, slope <1.0% Severe level of seasonal soil waterlogging or inundation for extended periods	Chromosolic redoxic hydrosols	Grassland of *Sorghum stipoideum*, *Eriachne burkittii*, *Paspalum scrobiculatum* with emergent trees	Broader study area
5b1	Drainage systems, drainage floors within upland terrain, slope <1.0% Severe level of seasonal soil waterlogging or inundation for extended periods	Kandosolic redoxic hydrosols	Woodland to open forest of *Lophostemon lactifluus*, *Corymbia bella*, *Melaleuca viridiflora* over mixed grasses.	Intersects proposed infrastructure
7a2	Gently undulating low rises and lower slopes; rock outcrop	Shallow brown kandosols, well drained	Tall open woodland of *E. miniata, E. tetrodonta* over *Sorghum* spp. *Eriachne avenacea, Heteropogon triticeus*	Broader study area
8a5	Gently and moderately inclined plains; no rock outcrop	Hydrosols, poorly drained	Open woodland of *Erythrophleum chlorostachys*, *E. tetrodonta* over *Sorghum* spp.	South of the Charlotte River

Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ22214 - Lithium Plus Environmental approval baseline studies\1. Project Files\2. Report Maps\Map of land units relevant to the study area with camera trap locations.mxd

Figure 3-1. Map of land units relevant to the study area with camera trap locations

3.2.1 Significant vegetation

In the NT, certain vegetation types are considered significant under the *Land Clearing Guidelines* (DENR 2019) due to their unique and/or inherently high biodiversity values. Of relevance to the study area are three significant vegetation types: riparian vegetation, mangroves and old-growth forest. *The Land Clearing Guidelines* must be applied to and clearing under the *Planning Act*, but can also be used as guidance for other types of developments such as mining.

Riparian vegetation

Riparian vegetation is 'a distinct forest community occurring on the banks of rivers or streams that directly influences the adjacent water body' (DENR 2018c). When in good condition, riparian vegetation is considered a sensitive vegetation type as it supports a unique selection of habitat features that are relied upon by a range of flora and fauna species. Riparian vegetation edges the river and creek lines that cross the study area – specifically Charlotte River and its tributaries (Figure 1-1).

The *Land Clearing Guidelines* recommend buffering riparian vegetation associated with a third-order watercourse – as Charlotte River is – by 100 metres from the outer edge of the riparian vegetation.

Mangroves

Occur in the NT along sheltered coastlines, growing in tidal areas frequently inundated by salt water, and are associated with estuaries, sheltered embankments and tidal rivers. This vegetation type contains many unique and highly specialised animals and plants, including many species restricted to these environments (DENR 2018a). The NT Government produced mapping of mangrove communities in Bynoe Harbour in 2003 at the scale of 1:10,000 (DEPWS 2019b). Aerial imagery shows that mangrove woodlands occur directly downstream of the study area.

Old-growth forest

Tree hollows provide valuable habitat for fauna. In the NT, a *Eucalyptus* forest that has either five or more *Eucalypt* stems growing greater than 50 cm in diameter at breast height (dbh) per hectare, and/or 30 or more *Eucalypt* stems greater than 40 cm dbh per ha is considered to be of high value for biodiversity (DNRETAS 2010). Some large hollow-bearing trees were noted during field surveys at CT03, however, the densities observed did not qualify for sensitive vegetation. Further assessment of the study area may be required once the footprint is refined.

3.2.2 Groundwater-dependent ecosystems

Groundwater-dependent ecosystems (GDE's) refer to 'natural ecosystems that require access to groundwater to meet all or some of their water requirements on a permanent or intermittent basis, so as to maintain their communities of plants and animals, ecosystem processes and ecosystem services' (Richardson et al. 2011). Groundwater is especially important to ecosystems in arid and semi-arid parts of the country and when there are extended dry periods, during which evaporation markedly exceeds precipitation and so surface water is scarce (Eamus et al. 2006).

Based on definitions from Eamus et al. (2006), the Atlas of Groundwater Dependent Ecosystems maps three types of GDE – *subterranean*, *aquatic* (i.e. ecosystems dependant on surface expression of groundwater) and *terrestrial* (i.e. ecosystems dependent on the sub-surface presence of groundwater, often accessed when roots penetrate via the capillary fringe which lies above the saturated zone of the water table). The Atlas classes each mapped GDE according to the degree of certainty that it is, indeed, a GDE.

A large portion of the study area is mapped as having moderate potential to be a terrestrial GDE. In this regard, however, the study area is similar to a vast area to the south and west that is also mapped as moderate potential. This is not an unusual situation in the Top End and is presumably due to the high wet season water-table and low-lying altitude. Importantly, there are no high potential GDE's within the study area.

3.2.3 Threatening processes

There are several threatening processes to biodiversity as a consequence of human presence in the region. The presence of weeds, feral animals, fire, and other impacts were noted where observed during field assessments. General observations were documented within the study area during field assessments to determine level of impacts from fire, feral animals, and weeds. These are discussed below.

Fire

The northern savannas constitute the most fire-prone landscapes in Australia (Russell-Smith & Whitehead 2015), and regular fires have always been a natural part of the environment in the Top End. However, frequent fires can result in fewer flora species and reduced structural complexity (McKay 2017), both of which can also significantly diminish the habitat quality for fauna and facilitate weed invasion.

Regional fire history and fire scar mapping was obtained through the Northern Australia and Rangelands Fire Information website – see Figure 3-2. In the past decade (2013 – 2022), all the study area had been burnt at least four times. However, sections north of Fog Bay Road have burn as many as 9 – 10 times in this period. Most of the study area last burnt in either 2022 or 2021. Overall, the study area has recorded high fire frequency.

Late season fires (from August onwards) are typically hotter than those occurring earlier in the Dry season. They are often anthropogenic in origin (i.e. not caused by lightning), and their effect on native flora and fauna is usually more detrimental. These hotter, more intense fires affect not just the ground and mid strata, which have evolved to adapt to fire, but also the more fire-sensitive canopy stratum.

During the 21-22 December field surveys, most of the sites (S03-S14) appeared to have been burned in the 2022 dry season, with a notable absence of rank grass. During camera trap deployment in May 2023, field observations concluded that it was evident that site CT02 and CT05 had been exposed to recent low-intensity fire, while all other sites had burnt last year. Ground cover was predominantly sparse with re-sprouting mixed grass species. Mid-stratum at the time of surveys was largely sparse or resprouting/re-generating, and in some patches absent. Fire char marks on canopy tree species were low and did not reach the canopy, further indicating the intensity and height of the fire was low.

Weeds

Weeds are introduced species that have been identified for control, eradication, or prevention of entry into the NT under the NT's Weeds Management Act 2001 (WM Act). They are classed according to how difficult they are to control and how much environmental and/or economic harm they can cause. If a weed is declared under the WM Act, all land holders, land managers and land users must comply with the classification. There are 3 categories of declared weeds:

- Class A – to be eradicated by landowners and occupiers.
- Class B – growth and spread to be controlled by landowners and occupiers.
- Class C – not to be introduced to the NT.

It is important to note that all Class A and B weeds are also considered Class C

The remaining introduced flora species are referred to as *environmental weeds*. The Commonwealth Government has also categorised some species as Weeds of National Significance (WoNS).

A weed survey was undertaken within the same portion of the study area as the land unit survey. The procedure for collecting weed data is described in detail below. Weed data (incidental records) was collected within the study area targeting priority species as outlined within the *Darwin Regional Weed Strategy 2021-2026* (DEPWS, 2021).

Weed data were collected in accordance with the *NT Weed Data Collection Manual* (WMB 2015), with the following information collected at each survey site: species, photographs and infestation level based on the size (diameter) and density. Density categories used in the assessment are:

- A = Absent, no weeds of this species in this area.
- B = < 1%, Very few, not many weeds e.g. single plant, perhaps with seedlings.
- C = 1 -10%, More than one or two isolated plants but not a lot e.g. a few small plants.
- D = 11-50%, A lot, up to half the area covered e.g.: a tree, dense patches of weeds.
- E = > 50%, Dominant cover is weed, more than half covered e.g. thickets, monocultures.

The weeds Gamba Grass (*Andropogon gayanus*) (Class A and B), Tully Grass (*Urochloa humidicola*) (not declared) and Stylo (*Stylosanthes* species) (not declared) were observed during field surveys. Gamba Grass was observed along an access track south of the proposed impact area (at the time of survey) and Tully Grass was observed near the Charlotte River at CR01. Stylo was observed occurring extensively along both sides of Fog Bay Road. Apart from Stylo, weed occurrence throughout the study area was low.

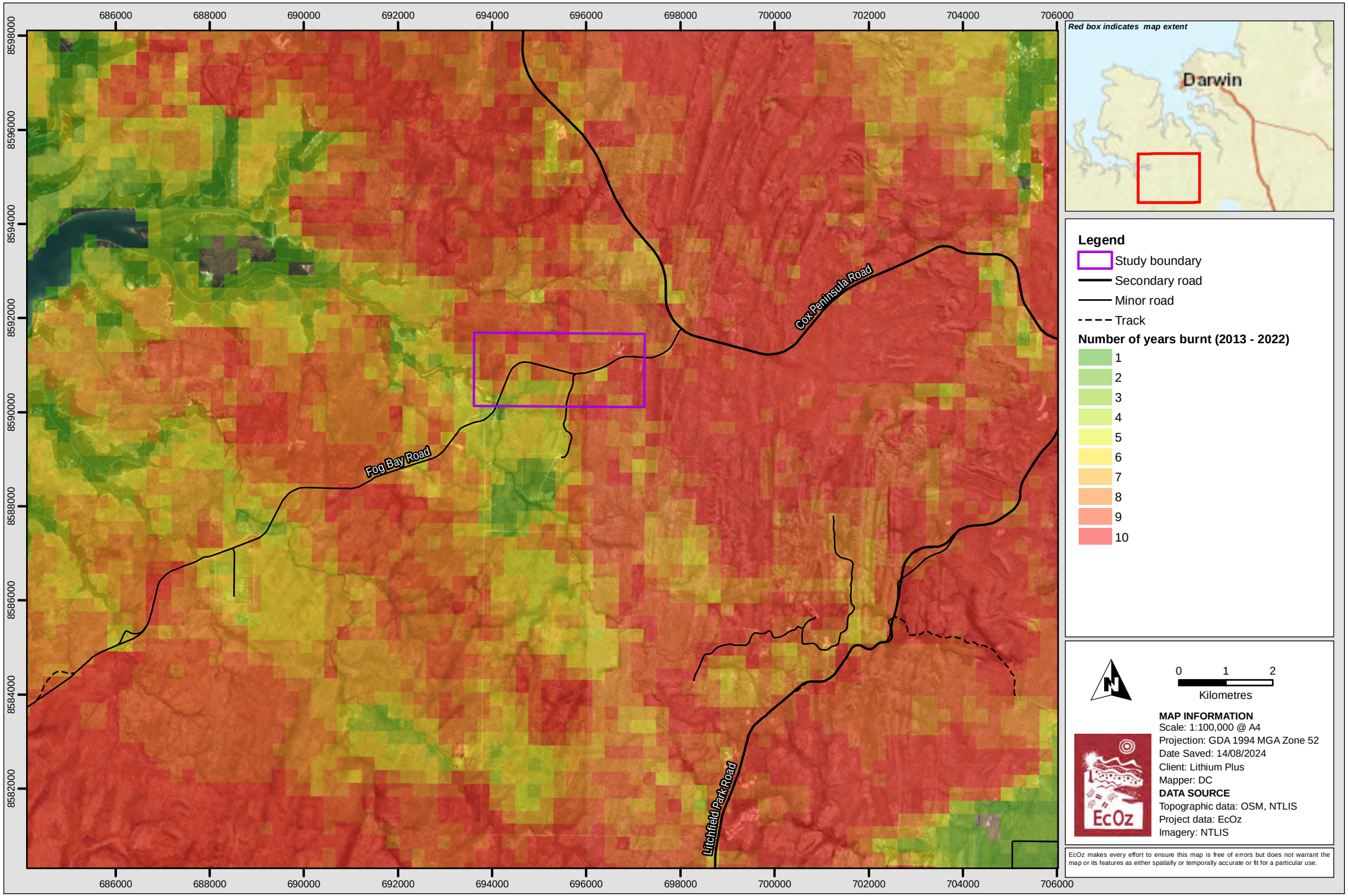
Pest animals

According to the NT Fauna Atlas, the introduced fauna species listed in Table 3-2 are widespread and abundant within the region, and hence likely to occur within the study area. Cane Toads, Feral Cats and Feral Pigs are each listed as a Key Threatening Process under the *EPBC Act*.

Feral animal presence was noted during the 21-22 December 2022 field surveys, with scats of *Sus scrofa* (Feral Pig) observed at S09. During habitat assessments on 14 June 2023, scats and tracks of feral pigs and cattle were observed in one of the open woodland habitats. The impacts observed from these feral species was assessed as low. Camera trapping detected Feral Pigs at two sites (CT03 and CT09) and Feral Cats at three sites (CT04, CT05 and CT08).

Table 3-2. Pest animals that may occur within the study area (NT Atlas)

Common name	Scientific name	Habitats	Impacts
Feral Cattle	*Bos taurus*	Various	Erosion of soil and watercourses, weed spread, trampling and consumption of native flora, and sedimentation and increased nutrient levels in watercourses
Water Buffalo	*Bubalus bubalis*	Riparian areas and wetlands	
Horse	*Equus caballus*	Grassland and shrubland	
Wild Dog	*Canis lupus*	Various	Prey on many species of native animals
Feral Cat	*Felis catus*	Various	
Feral Pig	*Sus scrofa*	Riparian areas and wetlands	Physical damage to wetlands
House Mouse	*Mus domesticus*	Various	Compete with native species. May impact upon native vegetation via seed predation
Cane Toad	*Rhinella marina*	Various	Known to cause population reductions in a range of predatory species (due to poisoning by ingestion)
Asian House Gecko	*Hemidactylus frenatus*	Buildings and adjacent woodlands	Compete with, and predate upon, native species



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ22214 - Lithium Plus Environmental approval baseline studies\1. Project Files\2. Report Maps\Map of fire frequency within the region from the last 10 years.mxd

Figure 3-2. Map of fire frequency within the region from the last 10 years

4 THREATENED FLORA SURVEY

Targeted flora surveys were undertaken to verify the occurrence of threatened species identified in the desktop 'likelihood of occurrence' assessment conducted in Section 2.2 as having a high or medium likelihood of occurring in the study area.

The results will determine which threatened species need to be included within the project's risk assessment, and which can be reasonably excluded from further consideration because they are unlikely to occur within the study area. A revised threatened species 'likelihood of occurrence' assessment, based on the findings in this section, is presented in Section 5.3.

4.1 Darwin Cycad

Cycad specimens (leaves and fruit) were collected from four locations on 20-21 December 2022 and 17 February 2023 to determine the species present within the study area. Photographs of leaves, bark, and fruit were taken from each plant sampled to assist with identification. Specimens were keyed out to species where possible using the dichotomous key provided in *Flora of the Darwin Region Vol. 1* (Dixon 2011).

Of the areas surveyed, cycad populations were typically observed in low-moderate numbers, with all plants sampled within land unit 2a1. Cycad presence was recorded at the following sites: S01, S03 and S07 – see Figure 4-2.

The specimens observed within the survey sites – see, e.g. Figure 4-1 – shared some characteristics of both *Cycas maconochiei* and *Cycas armstrongii* and are therefore considered to be the hybrid *Cycas maconochiei x armstrongii.* This result is supported by genetic analysis of *Cycas* spp. (Clugston & Nagalingum 2016) and previous results from field studies undertaken by EcOz on nearby projects within the region. These hybrids are not considered as Vulnerable under the TPWC Act.

Figure 4-1. Photographs showing Cycad specimen observed within the study area

4.2 *Typhonium praetermissum*

The survey for *Typhonium praetermissum* followed the detection survey methodology developed by DEPWS (Bickerton et al. 2020). Surveys were timed to ensure maximum detectability (i.e. January – March after sufficient rainfall, when flowering and/or adequate leaf tissue is available).

Approximately 18 ha of suitable habitat within the study area was surveyed for *Typhonium praetermissum* by botanist Anna Lemon and EcOz Lead Consultant Suzanne Barber on 17 February 2022 – see Figure 4-2. Presence/absence surveys were undertaken within NTG moderate and high likelihood modelled habitat (approximately 9 ha) to detect the species using parallel traverses spaced 17 m apart. Each surveyor effectively covered a 2 m width on either side of each transect line (4 m width transect), giving approximately 20% coverage of the area surveyed. This transect width was based on the average distance that can be reliably observed, accounting for denser patches of vegetation cover observed near drainage line vegetation to the north. Land unit 2a1 was also surveyed within the proposed impact area at the time of the surveys, with surveyors employing a targeted meander to search across this area.

Although areas that were surveyed within modelled habitat appeared to be suitable (Appendix A), no *Typhonium praetermissum* plants were detected during the surveys. Additionally, no plants were observed within the proposed impact area during the surveys. An updated version of the *Typhonium praetermissum* habitat modelling was released following the targeted surveys, which omits previously modelled habitat from the study area. The closest observations for this species are located approximately 13 km east and 15 km west of the study area. Based on all available datasets and field survey results, there is a low likelihood of the species occurring within the study area.

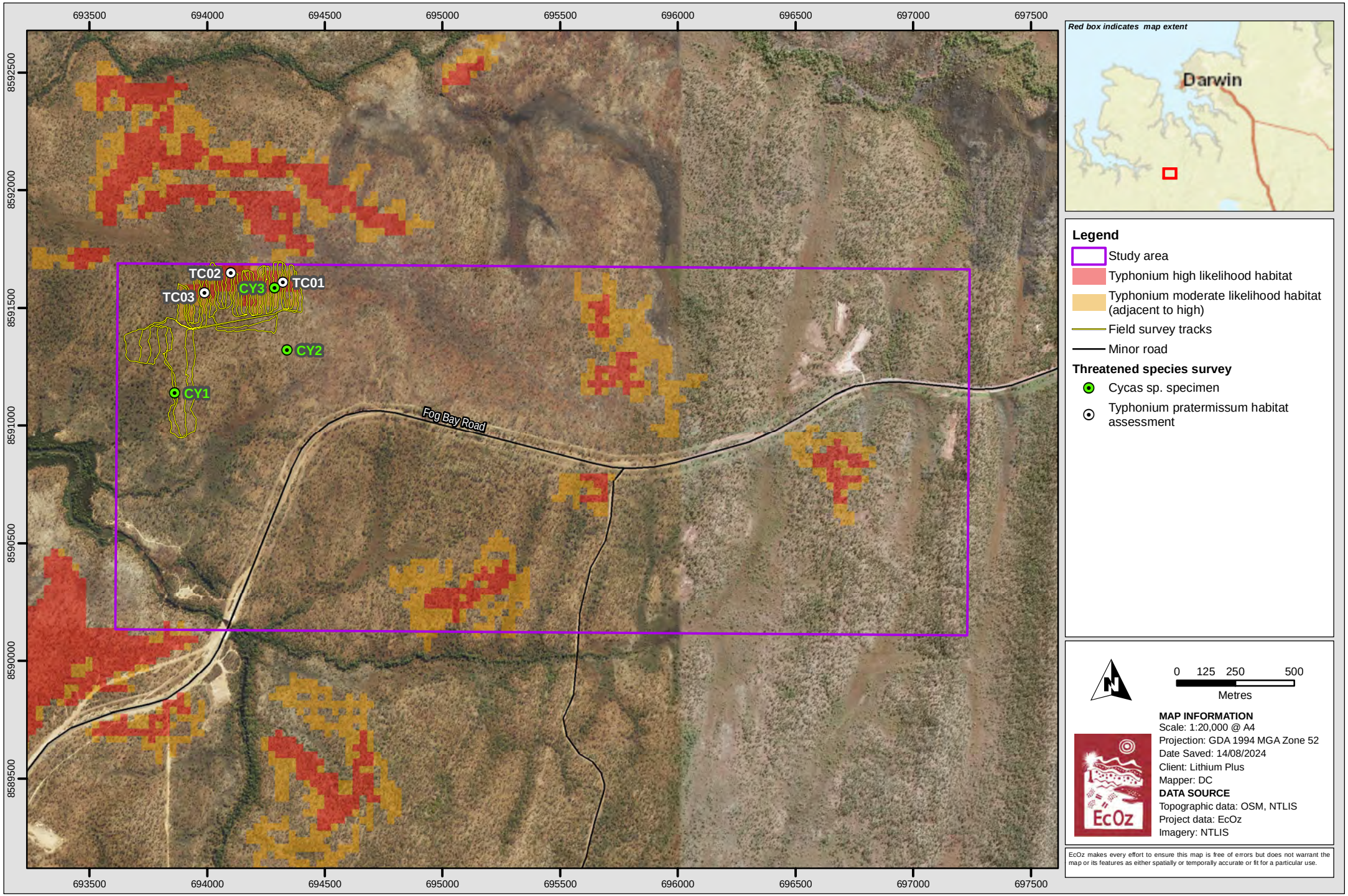


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Figure 4-2. Map of *Typhonium* and Cycad survey

5 THREATENED FAUNA SURVEY

Targeted fauna surveys were undertaken to verify the occurrence of threatened species identified in the desktop 'likelihood of occurrence' assessment conducted in Section 2.2 as having a high or medium likelihood of occurring in the study area. The results will determine which threatened species need to be included within the project's risk assessment, and which can be reasonably excluded from further consideration because they are unlikely to occur within the study area. A revised threatened species 'likelihood of occurrence' assessment, based on the findings in this section, is presented in Section 5.3.

5.1 Methods

5.1.1 Overview

Based on the results of the desktop 'likelihood of occurrence' assessment conducted in Section 2.2, the threatened species targeted in the surveys were the Northern Brushtail Possum (*Trichosurus vulpecula arnhemensis*), and Black-footed Tree-rat (*Mesembriomys gouldii gouldii)* and Partridge Pigeon (*Geophaps smithii smithii*).

Australian Government *Survey Guidelines for Australia's Threatened Mammals* (DSEWPC 2011) mention camera trapping in general as a methodology to detect various mammal species. However, these guidelines are out-dated and do not include the Northern Brushtail Possum and Black-footed Tree-rat. Advice on surveying these species has been sought from the Flora and Fauna Division of the Department of Environment, Parks and Water Security (DEPWS), who recommend using camera traps at a minimum sampling density of one camera site per 20 ha of suitable habitat, with cameras deployed for four weeks. In addition to this advice, camera trapping design and set up was guided by the following survey guidelines:

- *A Guide for the Use of Remote Cameras for Wildlife Survey in Northern Australia* (Gillespie et al. 2015)
- *Camera trapping SOP for the Top End Long-term Monitoring Program* (Gillespie et al. 2017)
- Optimising camera trap survey effort to reliably detect a threatened species, the black-footed tree-rat, *Mesembriomys gouldii*, in open forest and woodland of tropical savannas of the Top End, NT (Risler 2017).

The *Survey Guidelines for Australia's Threatened Birds* (DEWHA 2010) preceded the advent of camera trapping as a survey method, and so do not refer to it as a way to survey for Partridge Pigeon. The approved methodology is flushing the species during walking transects (which also occurs incidentally when undertaking other survey work) and waterhole watches (which is not applicable to the study area due to the absence of waterholes). Partridge Pigeons share similar habitat qualities to the Black-footed Tree-rat and Northern Brushtail Possum – namely a preference for foraging habitat within recently burnt/cleared areas – and are known to be attracted to the clearing of vegetation around camera traps that occurs during field set-up. Moreover, recent surveys by the NT Government on Middle Arm Peninsula justified the use of camera traps as a means of detecting Partridge Pigeon. Consequently, the deployment of camera traps – combined with the significant amount of time spent by ecologists in the study site (and hence the potentially flushing the species) – is considered adequate survey effort for this species.

The Bare-rumped Sheath-tail Bat is rarely detected as it tends to fly high. Thus, given the complexity in surveying for this species, a targeted field survey was considered inefficient and uninformative, and was not undertaken. Instead, based on the presence of suitable habitat (namely savanna woodland), this species is assumed to have a medium likelihood of occurring in the study area throughout this report.

Mitchell's Water Monitor is likely to be present in the mangroves downstream of the Charlotte River, and so also may occur – on occasion or permanently – in the riparian habitat within the study area. Likewise for

Mertens' Water Monitor. Because those species' presence may only be occasional, a targeted survey may not result in a detection, and so it is prudent to just assume that it could occur in the study area.

The Northern Blue-tongued Skink is newly listed under the *EPBC Act* and currently has no established survey methodology. However, the species has been detected incidentally using camera traps – e.g. by EcOz on Blackmore Peninsula in 2022.

5.1.2 Camera trapping

The targeted threatened fauna remote-sensing camera trapping survey was led by field ecologist Nathan Archer who has participated in several threatened fauna camera trap surveys with EcOz, including a major threatened species camera trapping project on Blackmore Peninsula in 2021. Nathan Archer was assisted by field ecologists Nerida Liddle, Simon Aylott and Laura Zaharie. Camera traps were deployed on 8, 11, 18 and 19 May and retrieved on 14 June 2023. Photographs and locations were recorded at all sites, with latitude and longitude of all sites presented in Appendix C.

A desktop review was undertaken using available recent aerial satellite imagery to determine suitable woodland habitat to place camera traps for the target species within the study area. Site selection was then adjusted in the field during the habitat mapping to maximise selection of prime habitat, consider site accessibility constraints, keep cameras out of public view to reduce potential interferences and theft of cameras, and due to methodology constraints detailed below. A total of 18 individual camera traps were established across six camera trapping sites within the study area.

Each site consisted of three Reconyx Hyperfire 2 White Flash cameras positioned approximately 50 m apart. Vertical cameras were set to a height of 40 cm and horizontal cameras were set to a height of 65 cm, with the camera focus point centred on the base of a bait station positioned at a height of 30 cm (as per Figure 5-1 and 5-2) Three different focal point distances from cameras were used (1.5 m, 2.5 m, and 65 cm) to incorporate variation in target species captures. Focal distances were decided during field set-up given site-specific constraints – i.e., dense vegetation cover at sites made it difficult to clear a 2.5 m focal distance. Cameras were set vertically for the 1.5 m and 2.5 m (as per Figure 5-3), and horizontally for the 65 cm drift-fence sites.

One drift net camera was used (focal distance of 65 cm) at each site, where suitable ground cover vegetation and soils allowed for appropriate set-up design. Drift net sites employ a camera set at an angle of roughly 45° and a height of 65 cm with the bait station positioned 65 cm from the camera (as per Figure 5-4). A cork board was secured in front of the bait station and a 4 m drift fence was placed on either side of the cork board. This camera trap site design encourages ground crawling species such as rodents and reptiles to run along the drift fence into direct view of the camera for capture. The cork board helps with animal detection by increasing the temperature differential between the small animal and warm ground.

Cameras were scheduled to be active from 18:00 – 07:00 each day, recording three still images per trigger at rapid-fire intervals between pictures, with no delay between subsequent triggers. Cameras were set at high sensitivity to maximise wildlife detection. Cameras were positioned facing southward and angled downward to prevent sun damage and glare. Cameras were attached to trees with sufficient diameters at breast height (> 20 cm dbh) to avoid camera movement in windy conditions. Each bait station consisted of a 50 mm PVC pipe with removable vent caps attached to a star picket via cable ties. Bait mixes contained peanut butter, oats, and honey. Insecticide granules was applied to the base of each star picket to deter ants.

All cameras had vegetation cleared from their field of view (approximately 2 m^2) to minimise false triggers from the movement of vegetation and ensure a clear view of any wildlife that moved within the range of the camera.

At each camera trapping site, field staff also conducted on-ground habitat assessment surveys. Habitat assessments were standardised to Level Five in the National Vegetation Information System and were undertaken in line with the *NT Guidelines and Field Methodology for Vegetation Survey and Mapping* (Brocklehurst et al. 2007). Each vegetation site comprised a 20 m quadrat to assess floristics and a broader 50 m quadrat to assess disturbance and key habitat features. Floristic assessment documented the three dominant flora species within each stratum (upper, mid and ground) and structural components of percent cover and height.

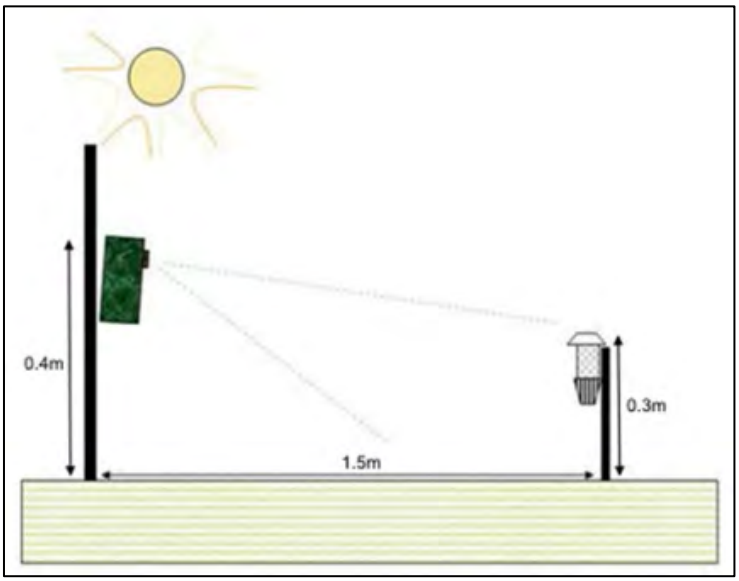


Figure 5-1. Diagram of vertical camera set-up for the target mammal species

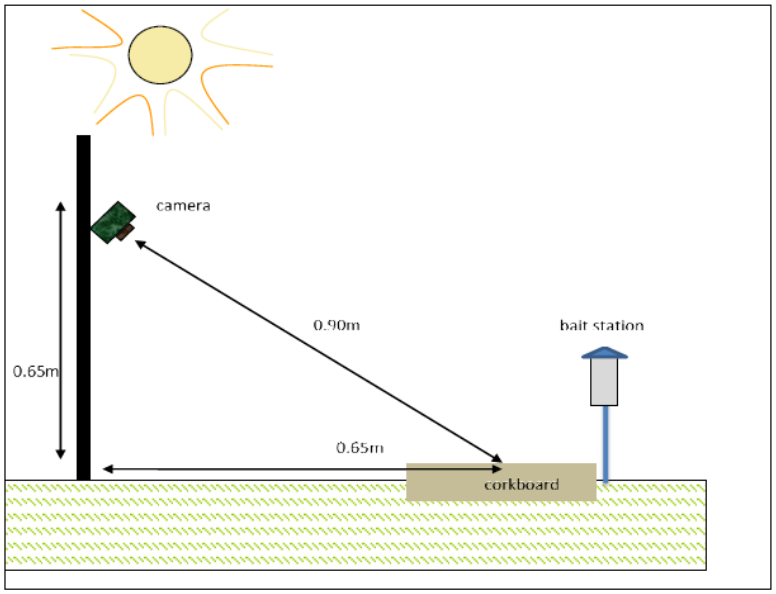


Figure 5-2. Diagram of horizontal camera set-up with drift net

Figure 5-3. Photographs of vertical camera set-up example at CT05 (left) and CT04 (right)

Figure 5-4. Photographs of horizontal camera set-up example at CT08 (left) and CT03 (right)

5.2 Results

5.2.1 General

Camera traps were in the field between 11 May to 14 June 2023. However, one camera returned only solid black photos, which was confirmed to be an issue with the flash, and three cameras took no photographs. As all cameras were set to night-mode only and all cameras were working during deployment testing, it is assumed that the three cameras with no images had no triggering events. EcOz completed a total survey effort of 505 trap nights across a total of 17 remote-sensing cameras deployed for the target threatened species.

In total, camera trapping detected 9 fauna species – 8 mammal, and 1 reptile. Of the target fauna species, the Black-footed Tree-rat and Northern Brushtail Possum were detected in the study area (see below for further detail). Another significant species detected was the Northern Brown Bandicoot – considered to be Near Threatened in the NT. A list of all species detected by remote camera traps is presented in Appendix D. It is important to note that without identification of clearly-separate individuals, the results do not depict the number of individuals across the survey site, but demonstrate the potential presence or absence of the species across the study area.

Habitat assessments included descriptions of the vegetation community structure and dominant flora, slope, as well as evidence of fire, presence of weeds, feral herbivores, food resources. Two habitat photographs were taken at the time of deployment per camera site. The results of the habitat assessments from each camera trapping site are presented in Appendix E. Notably, no weeds were detected within the study area during these assessments. Two habitat assessments were completed for CT08 (A & B) as the site is intersected by two land units.

5.2.2 Black-footed Tree-rat

Black-footed Tree-rats were detected at four out of six sites from seven out of 17 cameras across the study area – see Figure 5-5 and Table 5-1.

The dominant habitat across these sites was characterised by undulating terrain of open woodlands dominated by Darwin Woollybutt (*Eucalyptus miniata),* Darwin Stringybark (*Eucalyptus tetrodonta*) and Ironwood (*Erythrophleum chlorostachys*) with 20 – 30 % canopy covers, containing a mid-storey with mixed re-sprouting shrub species., Sand Palms (*Livistona humilis), Terminalia ferdinandiana* and *Grevillia pteridifolia*. Ground cover was predominantly mixed re-sprouting grass species including *Sorghum species* and mixed tree and shrub species saplings. The whole study area had fire estimates of less than 12 months based on on-ground field and desktop assessments. The Black-footed Tree-rat was not observed at CT02 or CT05 which had very recent fire disturbance and canopy cover of <15%.

The most recent known proximate targeted surveys for the Black-footed Tree-rat were completed by EcOz in 2022 at ML1148 and in 2021 on Blackmore Peninsula, both approximately 20 km (at its closest) from the study area. Notably, Black-footed Tree-rats were detected at all seven of the camera sites and 17 of 20 individual cameras within the study area of ML1148, indicating a high density of species presence. Results from the large-scale surveys at Blackmore Peninsula generated a significantly low trap success rate for the species. While the habitat of Blackmore Peninsula is similar to that observed in the current study area and ML1148, fire estimates at Blackmore Peninsula were much higher and there was greater evidence of feral species and recreation use throughout the area.

Figure 5-5. Photographs of unique Black-footed Tree-rats at CT08C3, CT08C3, CT09C2 and CT03C3

Table 5-1. Black-footed Tree-rat sightings across camera traps from 11/05/23 to 14/06/23

The 'X' in each cell represents species detection on the respective trap night. Sites without species are omitted. Nights when cameras were not deployed are shown in grey.

		Night																																
Site		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	CT03 C1																						x								x	x				
	CT03 C3																					x	x									x				
	CT04 C3										x																									
	CT08 C1				x						x				x																					
	CT08 C3					x																														
	CT09 C2										x																									
	CT09 C3			x																																

Table 5-2. Northern Brushtail Possum sightings across camera traps from 11/05/23 to 14/06/23

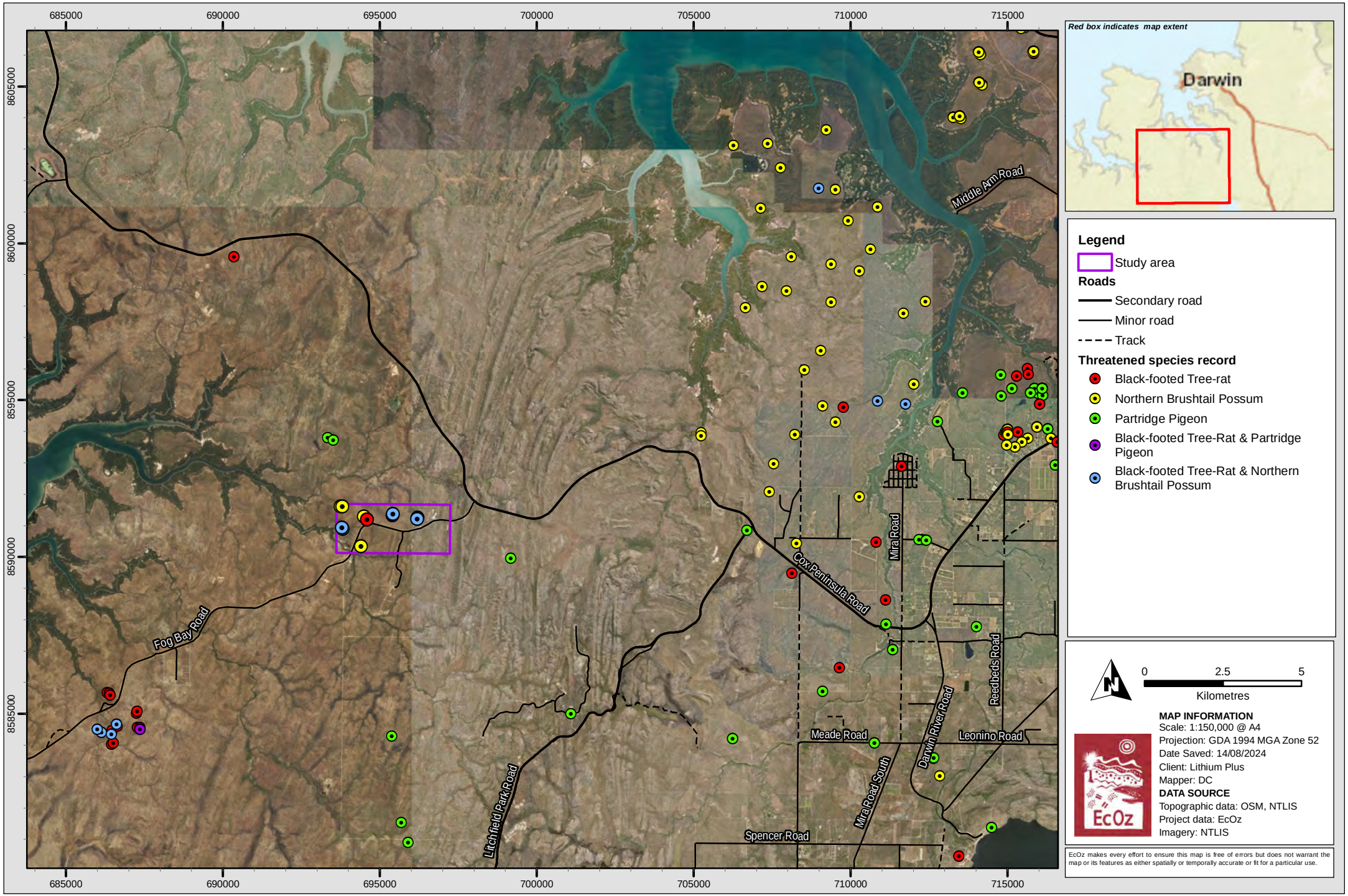
		Night																																		
Site		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	CT02 C1																									x	x									
	CT02 C3																																			
	CT03 C1								x																x										x	
	CT03 C2															x								x	x	x										x
	CT04 C1												x											x												x	
	CT04 C3																																x			
	CT05 C2										x																	x	x							
	CT05 C3									x	x	x															x	x	x							x
	CT08 C1		x		x	x							x									x											x		x
	CT08 C3				x																															
	CT09 C2									x																	x									
	CT09 C3																																			

5.2.3 Northern Brushtail Possum

Northern Brushtail Possums were observed at six out of six sites from 11 out of 17 cameras across the study area – see Figure 5-6 and Table 5-2. The species detection overlapped with sites that detected the Black-footed Tree-rats, and hence the species was observed in open woodlands dominated by Darwin Woollybutt (*Eucalyptus miniata),* Darwin Stringybark (*Eucalyptus tetrodonta*) and Ironwood (*Erythrophleum chlorostachys*) with 20 – 30 % canopy covers, containing a mid-storey with mixed re-sprouting shrub species., Sand Palms (*Livistona humilis), Terminalia ferdinandiana* and *Grevillia pteridifolia* as well as sites with smaller canopy cover. The species was also observed in sites with very recent cover and canopy cover of >15%, in which the Black-footed Tree-rat was not detected.

The species is usually highly interactive with camera traps, further increasing their detection rates at remote camera trapping sites. The most recent known proximate targeted surveys for the Northern Brushtail Possum were completed by EcOz in 2022 at ML1148 and in 2021 on Blackmore Peninsula, both approximately 20 km (at its closest) from the study area. Fauna surveys on ML1148 had a low detection rate of four of 20 cameras across 273 trap nights. While surveys on Blackmore Peninsula produced much higher detection of the species within woodland habitats, detecting the species at 32 of 39 sites across 3,960 trap nights.

Figure 5-6. Photographs of unique Northern Brushtail possums at CT02C1, CT04C1 and CT05C3



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ22214 - Lithium Plus Environmental approval baseline studies\1. Project Files\2. Report Maps\Locaiton of threatened fauina sightings within the study area_DC_240814.mxd

Figure 5-7. Map of location of threatened fauna sightings within the study area and recent sightings within the region

5.3 Revised likelihood of occurrence

In this section, the desktop likelihood of occurrence assessment undertaken in Section 2.2 is updated to incorporate the findings from the field surveys undertaken for this report. Table 5-3 presents the threatened species with a reasonable likelihood of occurring in the study area. The category 'known' has been added to account for the two threatened species observed within the study area during surveys.

No Northern Blue-tongued Skinks were detected incidentally within the study area – either on camera traps or while traversing the site on foot. This species occurs in a wide variety of ecosystems and has a close association with fresh water (of which there is none within, or proximate to, the study area). Habitat critical for the survival of this species – defined by DCCEEW (2023) because dense vegetation that provides cool, shaded, and damp conditions – is not present within the project area. No guidelines exist for surveying the Northern Blue-tongued Skink; however, they have previously been detected on camera surveys elsewhere and were not detected during 2023 camera surveys of the area. Consequently, the likelihood of this species being present has been reduced to Low.

As explained in Section 2.2, four species that were not detected should still be considered as having a reasonable chance of being present – perhaps only occasionally – within the study area. These are the Bare-rumped Sheath-tail Bat, which could roost in any large, hollow-bearing trees; Mitchell's Water Monitor in the mangroves downstream of the Charlotte River, and also in the riparian habitat within the study area; Mertens' Water Monitor in the same riparian habitat; and the Partridge Pigeon in savanna woodland.

Table 5-3. Updated threatened species likelihood of occurrence table

Likelihood	Species	Class	Status	
			EPBC	TPWC
KNOWN	Black-footed Tree-rat rat (Kimberley and mainland NT subspecies) *(Mesembriomys gouldii gouldii)*	Mammal	EN	VU
	Northern Brushtail Possum *(Trichosurus vulpecula arnhemensis)*		VU	-
MEDIUM	Partridge Pigeon (eastern subspecies) (*Geophaps smithii smithii)*	Bird	EN	VU
	Mitchell's Water Monitor (*Varanus mitchelli*)	Reptile	CR	VU
	Mertens' Water Monitor (*Varanus mertensi*)		EN	VU
	Bare-rumped Sheath-tailed bat (*Saccolaimus saccolaimus (nudicluniatus))*	Mammal	VU	-

CR = Critically Endangered; EN = Endangered; VU = Vulnerable

6 CONCLUSION

Because there are many recent records of Partridge Pigeon in the region, the presence of this species within the project area would not likely to be considered significant. Likewise for Mitchell's and Mertens' Water Monitor, and Bare-rumped Sheath-tailed Bat; the very small area of suitable habitat proximate to the study area – in comparison with the very large area of habitat in the region – means that their presence within the project area is not likely to be considered significant.

In contrast, the records within the study area of the Northern Brushtail Possum and the Black-footed Tree-rat are more significant. The majority of recent records of these species in the NT are from the Darwin rural area, where it is posited the species is protected from the higher rates of burning that are occurring across much of the species' range. It is recommended that a survey of optimum habitat in the region of the study area be undertaken to contextualise the records of the Northern Brushtail Possum and the Black-footed Tree-rat from this survey, and thereby inform a significant impact assessment.

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APPENDIX A LAND UNIT SITE DATA

Check site	**S01**			**Land unit**	**2a1**	
Coordinates	-12.738856, 130.790989 (GDA2020)					
Vegetation structure	Open Eucalypt woodland, minor woodland					
Landform	Low hills and rises, undulating. Slope 1-5 %, aspect NNW.					
Surface soils	Brown, gravelly sandy clay loam.					
Ground cover (%)	**Vegetation**	**Bare soil**	**Leaf litter**	**Rock**	**Gravel**	**Water**
	60	<1	35	0	5	0
Threatening processes	No recent fire or weeds observed, site located adjacent powerline infrastructure and access track.					

Vegetation	**Dominant species**	**Height range (m)**	**Cover (%)**
Upper stratum	*Eucalyptus miniata* *Eucalyptus tetrodonta* *Corymbia bleeseri*	10-14 10-14 8-10	20 10 5
Mid stratum	*Erythrophleum chlorostachys* *Grevillea decurrens* *Terminalia ferdinandiana*	5-8 1-3 2-6	5 5 <5
Ground stratum	*Heteropogon triticeus* *Eriachne ciliata* *Alloteropsis semialata*	<1 <0.5 <1	15 15 15
Other species	Low population of *Cycas* sp., occasional large hollow bearing tree.		

Check site	S02			Land unit	2a1	
Coordinates	-12.736435, 130.788657 (GDA2020)					
Vegetation structure	Open Eucalypt woodland, minor woodland					
Landform	Low hills and rises, gently undulating. Slope 1-3 %, aspect NNW.					
Surface soils	Brown, gravelly sandy clay loam.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	50	10	10	5	25	0
Threatening processes	Unlikely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed, site located adjacent access track.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Eucalyptus miniata* *Eucalyptus tetrodonta*	12-14 12-14	10 10
Mid stratum	*Erythrophleum chlorostachys* Juvenile upper spp. *Livistona humilis*	6-8 4-8 1-4	<5 10 5
Ground stratum	*Heteropogon triticeus* *Sorghum plumosum* *Eriachne ciliata*	<1 <1 <0.5	10 10 10




Vegetation site	S03			Land unit	2a1	
Coordinates	-12.734165, 130.788768 (GDA2020)					
Vegetation structure	Open Eucalypt woodland, minor woodland					
Landform	Sideslopes, gentle undulations. Slope <2 %, aspect NW.					
Surface soils	Yellow-brown mottled sandy clay, gravelly.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	55	5	5	<1	35	0
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Eucalyptus tetrodonta* *Eucalyptus miniata* *Erythrophleum chlorostachys*	10-14 10-14 6-8	15 10 5
Mid stratum	*Livistona humilis* Juvenile upper spp. *Cycas* sp.	1-4 1-6 1-4	5 5 <1
Ground stratum	*Heteropogon triticeus* *Eriachne ciliata* *Alloteropsis semialata*	<1 <0.5 <1	5 5 5
Other species	Mid – *Grevillea decurrens*, *Buchanania obovata*, *Acacia lamprocarpa*; ground – *Helicteres darwinensis*, *Hibbertia dilatata*, *Trachymene* sp., *Drosera* sp., *Hibbertia* sp., *Spermacoce* sp., *Dodonaea hispidula*. Moderate *Cycas* sp. population present.		




Check site	S04			Land unit	5b1	
Coordinates	-12.733873, 130.785785 (GDA2020)					
Vegetation structure	Open woodland over shrubland					
Landform	Drainage systems within upland terrains. Slope <1 %, aspect N.					
Surface soils	Grey sandy clay loam, no gravel.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	80	18	2	0	0	NA
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Erythrophleum chlorostachys* *Eucalyptus tetrodonta* *Alstonia actinophylla*	8-10 10-12 10-12	10 5 5
Mid stratum	*Grevillea pteridifolia* *Lophostemon lactifluus* *Livistona humilis*	2-6 1-5 1-4	10 10 5
Ground stratum	Annual *Sorghum* sp. *Lophostemon lactifluus*	<1 <1	55 20




Vegetation site	S05			Land unit	2a1	
Coordinates	-12.735865, 130.784345 (GDA2020)					
Vegetation structure	Open Eucalypt woodland, minor woodland					
Landform	Low hills and rises, gently undulating. Slope <2 %, aspect NW.					
Surface soils	Grey-brown silty-clay loam, gravelly.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	55	15	5	5	20	NA
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Eucalyptus miniata* *Erythrophleum chlorostachys*	10-12 10-12	10 5
Mid stratum	*Livistona humilis* *Lophostemon lactifluus* *Eucalyptus miniata*	1-5 1-4 1-6	10 10 5
Ground stratum	Annual *Sorghum* sp. *Heteropogon triticeus* *Eriachne ciliata*	<1 <1 <0.5	20 10 15
Other species	Ground – *Helicteres darwinensis*, *Hibbertia* sp., *Alloteropsis semialata*, *Hibbertia dilatata*, *Dodonaea hispidula*, *Planchonia careya*, *Syzygium eucalyptoides* ssp. *bleeseri*.		




Check site	S06			Land unit	2a1	
Coordinates	-12.736687, 130.785887 (GDA2020)					
Vegetation structure	Open Eucalypt woodland, minor woodland					
Landform	Low hills and rises, gently undulating. Slope 1-3 %, aspect NNW.					
Surface soils	Yellow-brown sandy clay loam, gravelly.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	55	5	10	0	30	NA
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Eucalyptus miniata* *Eucalyptus tetrodonta* *Erythrophleum chlorostachys*	10-14 10-14 8-10	15 10 5
Mid stratum	Juvenile upper spp. *Livistona humilis*	1-6 1-4	20 5
Ground stratum	Annual *Sorghum* sp. *Heteropogon triticeus* *Eriachne ciliata*	<1 <1 <0.5	20 10 15

Vegetation site	S07			Land unit	2a1	
Coordinates	-12.739126, 130.78589 (GDA2020)					
Vegetation structure	Open Eucalypt woodland, minor woodland					
Landform	Low hills and rises.					
Surface soils	Yellow-brown sandy clay loam, very gravelly.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	40	20	5	5	30	NA
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Eucalyptus miniata* *Eucalyptus tetrodonta*	10-12 10-12	20 10
Mid stratum	*Grevillea decurrens* Juvenile upper spp. *Erythrophleum chlorostachys*	5 5 <5	5 5 <5
Ground stratum	*Heteropogon triticeus* Annual *Sorghum* sp. *Eriachne ciliata*	<1 <1 <0.5	5 10 10
Other species	Mid (~ 5%) – *Cycas* sp., *Livistona humilis*, *Buchanania obovata*, *Persoonia falcata*; ground (~ 15%) – *Helicteres darwinensis*, *Hibbertia dilatata*, *Indigofera* sp., *Drosera* sp., *Polygala* sp., *Trachymene* sp., *Planchonia careya*, *Hibbertia* sp. Low-mod density of *Cycas* sp. present.		




Vegetation site	S08			Land unit	4c	
Coordinates	-12.739171, 130.784149 (GDA2020)					
Vegetation structure	Mixed spp. open woodland					
Landform	Lower slopes (mixed between low rises and drainage). Slope 2-5 %, aspect W.					
Surface soils	Light brown-grey sandy clay.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	80	15	5	0	0	NA
Threatening processes	Unknown whether site was burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Erythrophleum chlorostachys* *Eucalyptus miniata* *Corymbia polysciada*	10-14 10-12 8-10	5 5 5
Mid stratum	*Pandanus spiralis* *Grevillea pteridifolia* *Livistona humilis*	1-4 1-5 1-3	5 5 5
Ground stratum	*Heteropogon triticeus* *Sorghum plumosum* *Grevillea pluricaulis*	<1 <1 <1	20 15 15
Other species	Upper (~ 2%)– *Eucalyptus tectifica*; Mid (~ 5%) – *Petalostigma pubescens*; Ground (~ 35%) – *Alloteropsis semialata*, *Spermacoce* sp., *Mnesithea rottboellioides*, *Hibbertia* sp., *Themeda* sp., Juvenile upper species.		

Vegetation site	S09			Land unit	4c	
Coordinates	-12.740711, 130.784111 (GDA2020)					
Vegetation structure	Mixed spp. low open woodland					
Landform	Lower slopes (mixed between low rises and drainage). Slope 1-3 %, aspect W.					
Surface soils	Yellow-brown sandy clay.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	60	35	5	0	0	NA
Threatening processes	Area likely to have burnt in previous dry season. No weeds observed. Cattle and pig scats present.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Erythrophleum chlorostachys* *Eucalyptus/Corymbia* spp.	8-10 4-8	15 <5
Mid stratum	*Grevillea pteridifolia* *Livistona humilis* *Pandanus spiralis*	2-5 1-4 2-4	2 2 1
Ground stratum	Annual *Sorghum* sp. *Sorghum plumosum* *Eriachne ciliata*	<1 <1 <0.5	30 5 10
Other species	Upper – *Corymbia polysciada*, *Corymbia foelscheana*, *Eucalyptus tectifica*; Ground (~ 25%) – *Heteropogon triticeus*, *Lophostemon lactifluus*, *Grevillea pluricaulis*, *Hibbertia* sp., *Spermacoce* sp., *Drosera* sp., *Xyris* sp.		

Vegetation site	S10			Land unit	5b1	
Coordinates	-12.741247, 130.786447 (GDA2020)					
Vegetation structure	Mixed spp. low-mid open woodland					
Landform	Alluvial drainage systems. Slope 1-5 %, aspect SE.					
Surface soils	Dark brown sandy loam.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	70	25	5	0	0	NA
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Melaleuca nervosa* *Lophostemon lactifluus* *Terminalia ferdinandiana*	8-12 10-14 10	10 10 <5
Mid stratum	*Pandanus spiralis* *Livistona humilis* *Grevillea pteridifolia*	1-6 1-4 1-6	5 5 <5
Ground stratum	Annual *Sorghum* sp. *Sorghum plumosum* *Hibbertia* sp.	<1 <1 <0.5	55 5 5
Other species	Upper (~ 2%) – *Corymbia polysciada*; mid (<5%) *Petalostigma pubescens*, *Banksia dentata*; ground (~ 10%) – *Fimbristylis* sp., *Drosera* sp., *Xyris* sp., *Heteropogon triticeus*.		

Check site	S11			Land unit	5b1	
Coordinates	-12.739769, 130.78793 (GDA2020)					
Vegetation structure	Sparse open woodland					
Landform	Alluvial plains, gentle slope with drainage line. Slope <1 %.					
Surface soils	Dark grey-brown clay loam.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	80	15	5	0	0	NA
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Corymbia polycarpa* *Corymbia polysciada*	8-10 8	<5 <1
Mid stratum	*Lophostemon lactifluus* *Grevillea pteridifolia* *Pandanus spiralis*	1-4 1-4 1-3	15 5 <5
Ground stratum	Annual *Sorghum* sp. *Eriachne* spp. *Fimbristylis* sp.	1-2 <1 <0.5	60 5 5

Vegetation site	S12			Land unit	4c	
Coordinates	-12.743035, 130.78651 (GDA2020)					
Vegetation structure	Mixed spp. open woodland					
Landform	Gentle lower slopes. Slope 0-2 %, aspect NNE.					
Surface soils	Yellow-brown sandy clay.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	50	40	10	0	0	NA
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Eucalyptus miniata* *Erythrophleum chlorostachys* *Corymbia polycarpa*	10-12 8-10 6-8	15 10 <5
Mid stratum	Juvenile upper spp. *Petalostigma pubescens* *Livistona humilis*	2-6 2-4 1-3	5 5 2
Ground stratum	Annual *Sorghum* sp. *Sorghum plumosum* *Eriachne* sp.	<1 <1 <1	15 15 5
Other species	Mid (~5%) – *Grevillea pteridifolia*, *Pandanus spiralis*, *Terminalia ferdinandiana*, *Xanthostemon paradoxus*; Ground (~10-15%) – *Chrysopogon latifolius*, *Brachychiton megaphyllus*, *Hibbertia dilatata*, *Corymbia polysciada*.		




Check site	S13			Land unit	4c	
Coordinates	-12.743387, 130.784894 (GDA2020)					
Vegetation structure	Mixed spp. open woodland					
Landform	Gentle lower slopes (mixed between low rises and drainage).					
Surface soils	Light grey silty clay.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	75	20	5	0	0	NA
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Eucalyptus miniata* *Erythrophleum chlorostachys* *Corymbia polysciada*	8-12 10-12 10-12	5 <5 <5
Mid stratum	*Livistona humilis* *Petalostigma pubescens* *Terminalia ferdinandiana*	1-4 1-4 4-8	<5 <5 1
Ground stratum	Annual *Sorghum* sp. *Heteropogon triticeus* *Sorghum plumosum*	<1 <1 <1	40 10 10
Other species	Ground (~15%) – *Osbeckia australe*, *Fimbristylis* sp., juvenile upper species.		

Check site	S14			Land unit	2b1	
Coordinates	-12.743942, 130.787807 (GDA2020)					
Vegetation structure	Open Eucalypt woodland, minor woodland					
Landform	Steeper rises, undulating. Slope 5-15 %, aspect NW.					
Surface soils	Brown silty clay loam, very gravelly (siltstone)					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	50	2.5	2.5	5	40	AL
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed. Site located adjacent access track.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Eucalyptus miniata* *Eucalyptus tetrodonta* *Corymbia bleeseri*	10-14 10-14 8-10	10 10 5
Mid stratum	Juvenile upper spp. *Erythrophleum chlorostachys* *Grevillea decurrens*	2-8 4-8 1-3	15 <5 5
Ground stratum	*Heteropogon triticeus* *Indigofera* sp. *Eriachne ciliata*	<1 <1 <0.5	15 15 10

Vegetation site	CR01			Land unit	10e1	
Coordinates	-12.745112, 130.785102 (GDA2020)					
Vegetation structure	*Melaleuca* spp. open woodland over mangroves					
Landform	Riparian/Estuarine - Charlotte River					
Surface soils	Brown clay sand on top edge of bank					
Ground cover (%)	**Vegetation**	**Bare soil**	**Leaf litter**	**Rock**	**Gravel**	**Water**
	45	15	10	2	5	23
Threatening processes	Area likely to have burnt in previous dry season. *Urochloa humidicola* (Tully Grass) present within site. No evidence of feral animal presence observed. Site located adjacent access track and possible camp site.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Melaleuca viridiflora* *Acacia auriculiformis*	10-14 6-8	10-15 5
Mid stratum	*Diospyros* sp. *Ceriops tagal* *Hibiscus tiliaceus*	2-5 2-4 2-5	10 20 5
Ground stratum	Annual *Sorghum* sp. *Germania grandiflora* *Crinum angustifolia*	<1 <1 <0.5	10 5 5
Other species	Ground (~ 25%) – *Flagellaria indica*, *Acrostichum speciosum*, *Ampelocissus* sp., *Ichnocarpus frutescens*		

Photo site	CR02	Land unit	9a, 9b and 10e1
Coordinates	-12.743579, 130.783269 (GDA2020)		
Other site notes	Riparian/Estuarine system - Charlotte River. *Melaleuca* spp. open woodland over mangroves.		

Vegetation site	CR03			Land unit	9a, 9b and 10e1	
Coordinates	-12.742184, 130.783584 (GDA2020)					
Vegetation structure	*Melaleuca* spp. open woodland over mangroves					
Landform	Riparian/Estuarine tributary - Charlotte River					
Surface soils	Brown sandy clay.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	50	25	10	5	0	10
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed. Site located adjacent access track and possible camp site.					

Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Melaleuca viridiflora* *Acacia auriculiformis*	10-12 6-8	20 10
Mid stratum	*Diospyros* sp. *Ceriops tagal* *Acacia auriculiformis*	3-5 2-6 2-4	10 15 5
Ground stratum	*Germania grandiflora* Annual *Sorghum* sp. *Acrostichum speciosum*	<1 <1 <1	25 20 5
Other species	Ground (< 2%) – *Flagellaria indica*, *Ichnocarpus frutescens*. Creek flow is a small trickle.		

Vegetation site	CR04			Land unit	9a, 9b and 10e1	
Coordinates	-12.740338, 130.783022 (GDA2020)					
Vegetation structure	*Melaleuca* spp. open woodland over mangroves					
Landform	Riparian/Estuarine tributary - Charlotte River					
Surface soils	Brown sandy clay.					
Ground cover (%)	Vegetation	Bare soil	Leaf litter	Rock	Gravel	Water
	45	20	25	5	0	5
Threatening processes	Area likely to have burnt in previous dry season. No weeds or evidence of feral animal presence observed.					

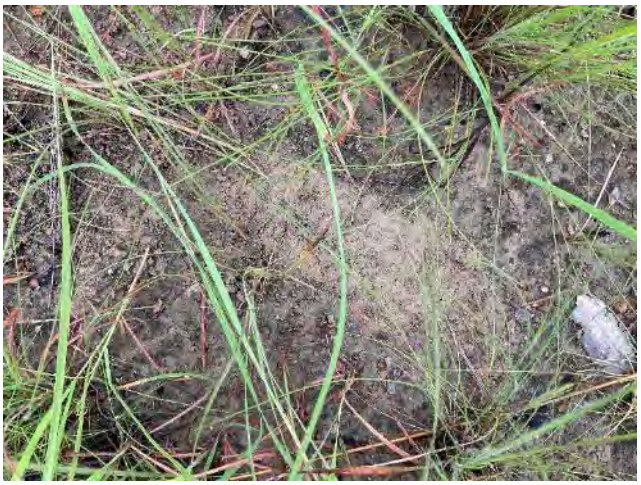
Vegetation	Dominant species	Height range (m)	Cover (%)
Upper stratum	*Melaleuca viridiflora* *Acacia auriculiformis*	6-10 6-8	10 <1
Mid stratum	*Ceriops tagal* *Thespesia populneoides*	2-6 2-5	20 <5
Ground stratum	Unknown rush sp. *Germania grandiflora* *Crinum angustifolia*	<1 <1 <1	35 5 <5
Other species/notes	Ground (< 1%) – *Ichnocarpus frutescens*. Creek flowing into mangrove system.		




Habitat assessment *Typhonium praetermissum* check site	**TC01**	**Land unit**	**2a1**
Coordinates	-12.734017, 130.789805 (GDA2020)		
Vegetation structure	*Eucalyptus* spp. open woodland (minor woodland)		
Landform	Sideslopes, gentle rises.		
Surface soils	Brown, gravelly sandy clay loam.		

Habitat assessment *Typhonium praetermissum* check site	**TC02**	**Land unit**	**2a1**
Coordinates	--12.733672, 130.787761 (GDA2020)		
Vegetation structure	*Eucalyptus* spp. open woodland (minor woodland)		
Landform	Sideslopes, gentle rises.		
Surface soils	Brown, gravelly sandy clay loam.		

Habitat assessment *Typhonium praetermissum* check site	**TC03**	**Land unit**	**2a1**
Coordinates	-12.734441, 130.786741 (GDA2020)		
Vegetation structure	*Eucalyptus* spp. open woodland (minor woodland)		
Landform	Sideslopes, gentle rises.		
Surface soils	Grey-brown sandy clay.		



APPENDIX B PROTECT MATTERS SEARCH TOOL (PMST) REPORT

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 07-Aug-2024

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	58
Listed Migratory Species:	71

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	90
Commonwealth Heritage Places:	7
Listed Marine Species:	110
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	1

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	12
Regional Forest Agreements:	None
Nationally Important Wetlands:	4
EPBC Act Referrals:	57
Key Ecological Features (Marine):	None
Biologically Important Areas:	6
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species			[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Epthianura crocea tunneyi Alligator Rivers Yellow Chat, Yellow Chat (Alligator Rivers) [67089]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Erythrura gouldiae Gouldian Finch [413]	Endangered	Species or species habitat known to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area	In feature area
Geophaps smithii smithii Partridge Pigeon (eastern) [64441]	Vulnerable	Species or species habitat known to occur within area	In feature area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In buffer area only
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat known to occur within area	In feature area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area	In buffer area only
FROG			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Uperoleia daviesae			
Howard River Toadlet, Davies's Toadlet [85375]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
MAMMAL			
Antechinus bellus			
Fawn Antechinus [344]	Vulnerable	Species or species habitat known to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Conilurus penicillatus			
Brush-tailed Rabbit-rat, Brush-tailed Tree-rat, Pakooma [132]	Vulnerable	Species or species habitat may occur within area	In feature area
Dasyurus hallucatus			
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area	In feature area
Hipposideros inornatus			
Arnhem Leaf-nosed Bat [86675]	Endangered	Species or species habitat may occur within area	In buffer area only
Macroderma gigas			
Ghost Bat [174]	Vulnerable	Species or species habitat known to occur within area	In feature area
Mesembriomys gouldii gouldii			
Black-footed Tree-rat (Kimberley and mainland Northern Territory), Djintamoonga, Manbul [87618]	Endangered	Species or species habitat known to occur within area	In feature area
Petrogale concinna canescens			
Nabarlek (Top End) [87606]	Endangered	Species or species habitat known to occur within area	In feature area
Phascogale pirata			
Northern Brush-tailed Phascogale [82954]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Saccolaimus saccolaimus nudicluniatus			
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Trichosurus vulpecula arnhemensis](#) Northern Brushtail Possum [83091]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Xeromys myoides](#) Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat known to occur within area	In feature area
PLANT			
[Atalaya brevialata](#) [86125]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
[Goodenia quadrifida](#) [56035]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Helicteres macrothrix](#) [86586]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Stylidium ensatum](#) a triggerplant [86366]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Typhonium taylorii listed as Typhonium taylori](#) [93459]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Xylopia monosperma](#) a shrub [82030]	Endangered	Species or species habitat may occur within area	In buffer area only
REPTILE			
[Acanthophis hawkei](#) Plains Death Adder [83821]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding known to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In buffer area only
Tiliqua scincoides intermedia Northern Blue-tongued Skink [89838]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Varanus mertensi Mertens' Water Monitor, Mertens's Water Monitor [1568]	Endangered	Species or species habitat known to occur within area	In feature area
Varanus mitchelli Mitchell's Water Monitor [1569]	Critically Endangered	Species or species habitat known to occur within area	In feature area
SHARK			
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Glyphis garricki Northern River Shark, New Guinea River Shark [82454]	Endangered	Species or species habitat known to occur within area	In buffer area only
Glyphis glyphis Speartooth Shark [82453]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pristis pristis			
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pristis zijsron			
Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus			
Common Noddy [825]		Species or species habitat likely to occur within area	In buffer area only
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Calonectris leucomelas			
Streaked Shearwater [1077]		Species or species habitat known to occur within area	In buffer area only
Fregata ariel			
Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area	In buffer area only
Fregata minor			
Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area	In buffer area only
Phaethon lepturus			
White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Sternula albifrons			
Little Tern [82849]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Species			
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat known to occur within area	In buffer area only
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Dugong dugon Dugong [28]		Species or species habitat known to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding known to occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat may occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In buffer area only
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Breeding known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tursiops aduncus (Arafura/Timor Sea populations)](#)			
Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area	In buffer area only
Migratory Terrestrial Species			
[Cecropis daurica](#)			
Red-rumped Swallow [80610]		Species or species habitat known to occur within area	In feature area
[Cuculus optatus](#)			
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
[Hirundo rustica](#)			
Barn Swallow [662]		Species or species habitat known to occur within area	In feature area
[Motacilla cinerea](#)			
Grey Wagtail [642]		Species or species habitat known to occur within area	In feature area
[Motacilla flava](#)			
Yellow Wagtail [644]		Species or species habitat known to occur within area	In feature area
[Rhipidura rufifrons](#)			
Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
[Acrocephalus orientalis](#)			
Oriental Reed-Warbler [59570]		Species or species habitat may occur within area	In feature area
[Actitis hypoleucos](#)			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#)			
Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
[Calidris acuminata](#)			
Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area	In buffer area only
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area	In buffer area only
Charadrius dubius Little Ringed Plover [896]		Roosting known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting known to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area	In feature area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area	In buffer area only
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa incana			
Wandering Tattler [831]		Roosting known to occur within area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
Tringa stagnatilis			
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only
Xenus cinereus			
Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Attorney-General - Australian Customs Service		
Commonwealth Land - Australian Customs Service [70998]	NT	In buffer area only
Attorney-General - Australian Government Solicitor		
Commonwealth Land - Australian Government Solicitor [70450]	NT	In buffer area only
Commonwealth Land - Australian Government Solicitor [70093]	NT	In buffer area only
Commonwealth Land - Australian Government Solicitor [70092]	NT	In buffer area only
Commonwealth Land - Australian Government Solicitor [70208]	NT	In buffer area only
Commonwealth Land - Australian Government Solicitor [71135]	NT	In buffer area only
Commonwealth Land - Australian Government Solicitor [70089]	NT	In buffer area only
Commonwealth Land - Australian Government Solicitor [70444]	NT	In buffer area only
Commonwealth Land - Australian Government Solicitor [70332]	NT	In buffer area only
Commonwealth Land - Australian Government Solicitor [70996]	NT	In buffer area only
Commonwealth Land - Deputy Crown Solicitor [70334]	NT	In buffer area only
Commonwealth Land - Deputy Crown Solicitor [70333]	NT	In buffer area only
Commonwealth Land - Deputy Crown Solicitor [70994]	NT	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - AUSTRALIAN ARMY BAND - DARWIN [70042]	NT	In buffer area only
Defence - BERRIMAH ONE [70053]	NT	In buffer area only
Defence - DARWIN - AP10 RADAR SITE - LEE POINT [70021]	NT	In buffer area only
Defence - DARWIN - AP3 RECEIVING STATION - LEE POINT [70044]	NT	In buffer area only
Defence - DARWIN RELOCATIONS CENTRE [70045]	NT	In buffer area only
Defence - DARWIN RIVER GRAVEL QUARRY [70025]	NT	In buffer area only
Defence - DARWIN RIVER GRAVEL QUARRY [70026]	NT	In buffer area only
Defence - DARWIN - TRANSMITTING STATION '11 MILE' [70027]	NT	In buffer area only
Defence - DEFENCE FORCE CAREERS REFERENCE CENTRE [70046]	NT	In buffer area only
Defence - Esanda Builidng [70048]	NT	In buffer area only
Defence - HMAS COONAWARRA (Berrimah) [70050]	NT	In buffer area only
Defence - HMAS COONAWARRA (Berrimah) [70051]	NT	In buffer area only
Defence - HMAS COONAWARRA (Berrimah) [70049]	NT	In buffer area only
Defence - KANGAROO FLATS TRAINING AREA [70054]	NT	In buffer area only
Defence - KANGAROO FLATS TRAINING AREA [70055]	NT	In buffer area only
Defence - KANGAROO FLATS TRAINING AREA [70058]	NT	In buffer area only
Defence - KANGAROO FLATS TRAINING AREA [70056]	NT	In buffer area only
Defence - KANGAROO FLATS TRAINING AREA [70057]	NT	In buffer area only
Defence - KOWANDI NORTH COMMUNICATION STATION [70059]	NT	In buffer area only
Defence - KOWANDI NORTH COMMUNICATION STATION [70060]	NT	In buffer area only
Defence - KOWANDI SOUTH REPEATING STATION [70082]	NT	In buffer area only
Defence - KOWANDI SOUTH REPEATING STATION [70081]	NT	In buffer area only
Defence - KOWANDI SOUTH REPEATING STATION [70080]	NT	In buffer area only
Defence - KOWANDI SOUTH REPEATING STATION [70079]	NT	In buffer area only
Defence - LARRAKEYAH BARRACKS [70061]	NT	In buffer area only
Defence - LEANYER BOMBING RANGE [70024]	NT	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - LEANYER BOMBING RANGE [70023]	NT	In buffer area only
Defence - LEANYER BOMBING RANGE [70022]	NT	In buffer area only
Defence - Patrol Boat Base (DARWIN NAVAL BASE) [70041]	NT	In buffer area only
Defence - QUAIL ISLAND BOMBING RANGE [70003]	NT	In buffer area only
Defence - RAAF BASE DARWIN [70073]	NT	In buffer area only
Defence - RAAF BASE DARWIN [70072]	NT	In buffer area only
Defence - ROBERTSON BARRACKS (Waler Barracks) [70030]	NT	In buffer area only
Defence - SHOAL BAY RECEIVING STATION [70037]	NT	In buffer area only
Defence - SHOAL BAY RECEIVING STATION [70038]	NT	In buffer area only
Defence - SHOAL BAY RECEIVING STATION [70036]	NT	In buffer area only
Defence - STOKES HILL OIL FUEL INSTALLATION [70035]	NT	In buffer area only
Defence - WINNELLIE ONE [70076]	NT	In buffer area only
Defence - WINNELLIE TWO [70077]	NT	In buffer area only
Defence - Defence Housing Authority		
Commonwealth Land - Director of Property Services Defence Estate [70715]	NT	In buffer area only
Commonwealth Land - Director of Property Services Defence Estate [70714]	NT	In buffer area only
Commonwealth Land - Director of Property Services Defence Estate [70722]	NT	In buffer area only
Commonwealth Land - Director of Property Services Defence Estate [70856]	NT	In buffer area only
Commonwealth Land - Director of Property Services Defence Estate [70855]	NT	In buffer area only
Commonwealth Land - Director of Property Services Defence Estate [70858]	NT	In buffer area only
Commonwealth Land - Director of Property Services Defence Estate [71000]	NT	In buffer area only
Family and Community Services - Department of Community Services & Health		
Commonwealth Land - Department of Community Services & Health [70720]	NT	In buffer area only
Finance and Administration		
Commonwealth Land - Department of Administrative Services [70210]	NT	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Department of Administrative Services [70091]	NT	In buffer area only
Commonwealth Land - Department of Administrative Services [70590]	NT	In buffer area only
Immigration and Multicultural and Indigenous Affairs - Department of Immigration Local Government and Ethnic Affairs		
Commonwealth Land - Department of Immigration Local Government & Ethnic Affairs [70336]	NT	In buffer area only
Transport and Regional Services		
Commonwealth Land - Department of Transport & Regional Development [70207]	NT	In buffer area only
Unknown		
Commonwealth Land - [70580]	NT	In buffer area only
Commonwealth Land - [70090]	NT	In buffer area only
Commonwealth Land - [70999]	NT	In buffer area only
Commonwealth Land - [70209]	NT	In buffer area only
Commonwealth Land - [70335]	NT	In buffer area only
Commonwealth Land - [70338]	NT	In buffer area only
Commonwealth Land - [70327]	NT	In buffer area only
Commonwealth Land - [70595]	NT	In buffer area only
Commonwealth Land - [70721]	NT	In buffer area only
Commonwealth Land - [70337]	NT	In buffer area only
Commonwealth Land - [70101]	NT	In buffer area only
Commonwealth Land - [70734]	NT	In buffer area only
Commonwealth Land - [70593]	NT	In buffer area only
Commonwealth Land - [70591]	NT	In buffer area only
Commonwealth Land - [70594]	NT	In buffer area only
Commonwealth Land - [70859]	NT	In buffer area only
Commonwealth Land - [70447]	NT	In buffer area only
Commonwealth Land - [70204]	NT	In buffer area only
Commonwealth Land - [70205]	NT	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [70206]	NT	In buffer area only
Commonwealth Land - [70993]	NT	In buffer area only
Commonwealth Land - [70995]	NT	In buffer area only
Commonwealth Land - [70203]	NT	In buffer area only
Commonwealth Land - [70608]	NT	In buffer area only
Commonwealth Land - [71003]	NT	In buffer area only

Commonwealth Heritage Places [Resource Information]

Name	State	Status	Buffer Status
Historic			
Larrakeyah Barracks Headquarters Building	NT	Listed place	In buffer area only
Larrakeyah Barracks Precinct	NT	Listed place	In buffer area only
Larrakeyah Barracks Sergeants Mess	NT	Listed place	In buffer area only
RAAF Base Commanding Officers Residence	NT	Listed place	In buffer area only
RAAF Base Precinct	NT	Listed place	In buffer area only
RAAF Base Tropical Housing Type 2	NT	Listed place	In buffer area only
RAAF Base Tropical Housing Type 3	NT	Listed place	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Acrocephalus orientalis Oriental Reed-Warbler [59570]		Species or species habitat may occur within area overfly marine area	In feature area
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In buffer area only
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area overfly marine area	In buffer area only
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat known to occur within area	In buffer area only
[Cecropis daurica as Hirundo daurica](#) Red-rumped Swallow [80610]		Species or species habitat known to occur within area overfly marine area	In feature area
[Chalcites osculans as Chrysococcyx osculans](#) Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
[Charadrius dubius](#) Little Ringed Plover [896]		Roosting known to occur within area overfly marine area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
[Charadrius ruficapillus](#) Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
[Charadrius veredus](#) Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area overfly marine area	In feature area
[Fregata ariel](#) Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area	In buffer area only
[Fregata minor](#) Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area	In buffer area only
[Gallinago megala](#) Swinhoe's Snipe [864]		Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area overfly marine area	In feature area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area overfly marine area	In buffer area only
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla cinerea Grey Wagtail [642]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Stiltia isabella Australian Pratincole [818]		Roosting known to occur within area overfly marine area	In buffer area only
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
Tringa incana as Heteroscelus incanus Wandering Tattler [831]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area	In buffer area only
Fish			
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area	In buffer area only
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In buffer area only
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area	In buffer area only
Corythoichthys flavofasciatus Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area	In buffer area only
Corythoichthys haematopterus Reef-top Pipefish [66201]		Species or species habitat may occur within area	In buffer area only
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area	In buffer area only
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area	In buffer area only
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area	In buffer area only
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area	In buffer area only
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In buffer area only
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In buffer area only
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area	In buffer area only
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippichthys parvicarinatus Short-keel Pipefish, Short-keeled Pipefish [66230]		Species or species habitat may occur within area	In buffer area only
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In buffer area only
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area	In buffer area only
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In buffer area only
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area	In buffer area only
Hippocampus spinosissimus Hedgehog Seahorse [66239]		Species or species habitat may occur within area	In buffer area only
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area	In buffer area only
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In buffer area only
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In buffer area only
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In buffer area only
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Trachyrhamphus bicoarctatus](#) Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In buffer area only
[Trachyrhamphus longirostris](#) Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In buffer area only
Mammal			
[Dugong dugon](#) Dugong [28]		Species or species habitat known to occur within area	In buffer area only
Reptile			
[Aipysurus duboisii](#) Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area	In buffer area only
[Aipysurus laevis](#) Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area	In buffer area only
[Aipysurus mosaicus as Aipysurus eydouxii](#) Mosaic Sea Snake [87261]		Species or species habitat may occur within area	In buffer area only
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only
[Crocodylus johnstoni](#) Freshwater Crocodile, Johnston's Crocodile, Johnstone's Crocodile [1773]		Species or species habitat may occur within area	In feature area
[Crocodylus porosus](#) Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Hydrelaps darwiniensis Port Darwin Sea Snake, Black-ringed Mangrove Sea Snake [1100]		Species or species habitat may occur within area	In buffer area only
Hydrophis atriceps Black-headed Sea Snake [1101]		Species or species habitat may occur within area	In buffer area only
Hydrophis coggeri Cogger's Sea Snake [25925]		Species or species habitat may occur within area	In buffer area only
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area	In buffer area only
Hydrophis hardwickii as Lapemis hardwickii Spine-bellied Sea Snake [93516]		Species or species habitat may occur within area	In buffer area only
Hydrophis inornatus Plain Sea Snake [1107]		Species or species habitat may occur within area	In buffer area only
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area	In buffer area only
Hydrophis macdowelli as Hydrophis mcdowelli MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area	In buffer area only
Hydrophis major as Disteira major Olive-headed Sea Snake [93512]		Species or species habitat may occur within area	In buffer area only
Hydrophis ornatus Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydrophis pacificus Pacific Sea Snake, Large-headed Sea Snake [1112]		Species or species habitat may occur within area	In buffer area only
Hydrophis peronii as Acalyptophis peronii Horned Sea Snake [93509]		Species or species habitat may occur within area	In buffer area only
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area	In buffer area only
Hydrophis stokesii as Astrotia stokesii Stokes' Sea Snake [93510]		Species or species habitat may occur within area	In buffer area only
Hydrophis zweiffei as Enhydrina schistosa Australian Beaked Sea Snake [93514]		Species or species habitat may occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding known to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In buffer area only
Parahydrophis mertoni Arafura Smooth Sea Snake, Northern Mangrove Sea Snake [1090]		Species or species habitat may occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat may occur within area	In buffer area only
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Breeding known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Sousa sahulensis Australian Humpback Dolphin [87942]		Breeding known to occur within area	In buffer area only
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area	In buffer area only
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Habitat Critical to the Survival of Marine Turtles			[Resource Information]
Scientific Name	Behaviour	Presence	Buffer Status
Aug - Sep			
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur	In buffer area only

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Black Jungle / Lambells Lagoon Conservation Reserve	Other Conservation Area	NT	In buffer area only
Blackmore River	Conservation Reserve	NT	In buffer area only
Casuarina	Coastal Reserve	NT	In buffer area only
Charles Darwin	National Park	NT	In buffer area only
Holmes Jungle	Nature Park	NT	In buffer area only
Howard Springs	Nature Park	NT	In buffer area only
Howard Springs	Hunting Reserve	NT	In buffer area only
Knuckey Lagoons	Conservation Reserve	NT	In buffer area only
Litchfield	National Park	NT	In buffer area only
Manton Dam Recreation Area	Other Conservation Area	NT	In buffer area only
Territory Wildlife Park / Berry Springs	Other Conservation Area or Nature Park	NT	In buffer area only
Territory Wildlife Park / Berry Springs	Other Conservation Area	NT	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Adelaide River Floodplain System	NT	In buffer area only
Finniss Floodplain and Fog Bay Systems	NT	In buffer area only
Port Darwin	NT	In buffer area only
Shoal Bay - Micket Creek	NT	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Bayview, The Boulevarde, Darwin, NT	2015/7466		Assessment	In buffer area only
Berrimah Freight Terminal Expansion Project	2024/09847		Assessment	In buffer area only
Darwin Pipeline Duplication (DPD) Project	2022/09372		Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Darwin Ship Lift Project	2021/9068		Post-Approval	In buffer area only
East Arm Marine Industry Park, Darwin, NT	2014/7318		Completed	In buffer area only
Establishment and operation of a refinery at Darwin, NT	2015/7604		Assessment	In buffer area only
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia West	2024/09826		Completed	In buffer area only
Proposed City of Weddell	2011/6090		Assessment	In buffer area only
Rehabilitation of former Rum Jungle mine site, near Batchelor, NT	2016/7730		Post-Approval	In buffer area only
Controlled action				
Augmentation of the East Point Effluent Rising Main and Extension of East Point Outfall	2009/5113	Controlled Action	Post-Approval	In buffer area only
Barramundi Nursery Farm	2005/2378	Controlled Action	Completed	In buffer area only
Browns Oxide Project, New Tailings Storage Facility(2)	2007/3558	Controlled Action	Completed	In buffer area only
Browns Oxide Project Extension	2007/3242	Controlled Action	Completed	In buffer area only
Compass Resources NL/Mining/Rum Jungle/NT/Copper, cobalt and nickel mine - Browns Oxide Project	2005/2011	Controlled Action	Post-Approval	In buffer area only
Condensate Processing Facility, East Arm	2006/2734	Controlled Action	Proposed Decision	In buffer area only
Darwin to Moomba Gas Pipeline	2001/213	Controlled Action	Completed	In buffer area only
Development of Area 55 Oxide Project	2010/5324	Controlled Action	Completed	In buffer area only
East Arm Wharf Expansion Works	2010/5304	Controlled Action	Post-Approval	In buffer area only
Glyde Point and Middle Arm Peninsula Infrastructure Support	2001/334	Controlled Action	Completed	In buffer area only
Glyde Point Industrial Estate	2001/336	Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Glyde Point Industrial Estate and Associated Infrastructure	2004/1506	Controlled Action	Completed	In buffer area only
Howard Springs Sand Extraction Expansion, NT	2016/7699	Controlled Action	Completed	In buffer area only
Ichthys Gas Field, Offshore and onshore processing facilities and subsea pipeline	2008/4208	Controlled Action	Post-Approval	In buffer area only
Lee Point Master-planned urban development, Darwin, NT	2015/7591	Controlled Action	Post-Approval	In buffer area only
Methanol Plant	2001/195	Controlled Action	Completed	In buffer area only
Middle Arm Peninsula Industrial Area Development	2001/339	Controlled Action	Completed	In buffer area only
Mt Peake iron, vanadium and titanium mining project & assoc infrastructure, 280kms NNW Alice Springs	2013/7027	Controlled Action	Post-Approval	In buffer area only
Muirhead Subdivision	2010/5525	Controlled Action	Post-Approval	In buffer area only
Noonamah Ridge Residential Estate, Lloyd Creek, NT	2014/7269	Controlled Action	Further Information Request	In buffer area only
Operation of 17 Tiger Helicopters at Robertson Barracks	2004/1459	Controlled Action	Post-Approval	In buffer area only
Polymetallic Project-lead, copper, nickel, cobalt and silver	2001/535	Controlled Action	Completed	In buffer area only
Port Patterson Barramundi Sea Cage Farm	2005/2149	Controlled Action	Completed	In buffer area only
Replacement of the East Point Outfall	2011/6099	Controlled Action	Assessment Approach	In buffer area only
Residential subdivision of Lot 9793 (formerly Lots 9774 and 9779) Lee Point Road	2005/2108	Controlled Action	Post-Approval	In buffer area only
Shipping Channel Enhancement	2010/5431	Controlled Action	Completed	In buffer area only
Talisman Saber 2005 Military Exercise	2004/1819	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Aquaculture farm	2002/737	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Channel Island Bridge Pipeline Replacement Project	2020/8672	Not Controlled Action	Completed	In buffer area only
Core Breeding and Broodstock Maturation Centre development, Point Ceylon, NT	2016/7713	Not Controlled Action	Completed	In buffer area only
Cox Peninsular Remediation Project, NT	2015/7587	Not Controlled Action	Completed	In buffer area only
Crowley Government Services Inc Bulk Fuel Storage Facility	2021/9015	Not Controlled Action	Completed	In buffer area only
Darwin Port Maintenance Dredging, Darwin Harbour, NT	2017/8122	Not Controlled Action	Completed	In buffer area only
Darwin ship lift facility and marine industries project, Darwin Harbour NT	2018/8195	Not Controlled Action	Completed	In buffer area only
Field trials for cultivation of microalga (Botryococcus braunii) to produce hydr	2007/3277	Not Controlled Action	Completed	In buffer area only
industrial park and a Defence support hub	2006/3177	Not Controlled Action	Completed	In buffer area only
Magnesium Metal Mining	2001/225	Not Controlled Action	Completed	In buffer area only
Marine Survey for the Australia-ASEAN Power Link AAPL	2020/8714	Not Controlled Action	Completed	In buffer area only
Pilot Power Station to Utilise Fuel Gas from Mimosa Pigra	2002/841	Not Controlled Action	Completed	In buffer area only
Residential Complex - Lots 6575 and 6576	2001/163	Not Controlled Action	Completed	In buffer area only
Subdivision of Two Sites (1712 and 1713) into four Portions	2006/2755	Not Controlled Action	Completed	In buffer area only
Waterfront Redevelopment	2003/1256	Not Controlled Action	Completed	In buffer area only
Wickham Point Interconnect Gas Pipeline	2008/4309	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Dredging the outer shipping channels of Darwin Harbour	2013/6988	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Offshore Fibre Optic Cable Network Construction & Operation, Port Hedland WA to Darwin NT	2014/7223	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner) Referral decision				
Howard East Borefield Second Stage	2002/828	Referral Decision	Completed	In buffer area only
Phillips Petroleum Wickham Point LNG facility	2001/391	Referral Decision	Completed	In buffer area only
Yarram Iron Ore Project, near Batchelor, NT	2018/8209	Referral Decision	Referral Publication	In buffer area only

Biologically Important Areas			[Resource Information]
Scientific Name	Behaviour	Presence	Buffer Status
Dolphins			
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Breeding	Known to occur	In buffer area only
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Breeding	Known to occur	In buffer area only
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Known to occur	In buffer area only
Marine Turtles			
Lepidochelys olivacea Olive Ridley Turtle [1767]	Foraging	Likely to occur	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle [1767]	Internesting	Likely to occur	In buffer area only
Natator depressus Flatback Turtle [59257]	Internesting	Likely to occur	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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APPENDIX C THREATENED SPECIES 'LIKELIHOOD OF OCCURRENCE' ASSESSMENT

Likelihood determined based on the method presented in Section 2.2. Table updated to match the final likelihood of occurrence assessment presented in Section 6.3.

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
BIRDS				
Red Knot *Calidris canutus*	EN	VU	**Habitat:** Coastal and estuarine with tidal mudflats. May roost during high tide on nearby beaches. May also be found at near-coastal swamps and lakes (apart from Red and Great Knot) **Distribution:** Mostly widespread around the northern Australian coast, less common in the south, with few inland records. Eastern Curlew is uncommon across Australia while Asian Dowitcher is rare. Every year these species breed in the northern hemisphere in the summer, and migrate to Australia for the southern hemisphere summer. Some birds remain in Australia during the winter. Wilson et al. (2007) have shown that the two main Australian non-breeding regions belong to separate populations of Godwit. Subspecies *menzbieri* is generally present in north-western Australia and breed in north-eastern Russia, and subspecies *baueri* is generally present in south-eastern Australia and breed in northern and western Alaska (Wilson et al. 2007). It is thought that both subspecies probably migrate to the NT. Due to the difficulties of distinguishing between the two, they are treated within the NT as *Limosa lapponica* and listed collectively as Vulnerable (Ward 2012).	**LOW** • No coastal or estuarine tidal mudflats present within the study area
Curlew Sandpiper *Calidris ferruginea*	CR	VU		
Great Knot *Calidris tenuirostris*	CR	VU		
Greater Sand Plover *Charadrius leschenaultii*	VU	VU		
Lesser Sand Plover *Charadrius mongolus*	EN	VU		
Bar-tailed Godwit (Western Alaskan subspecies) *Limosa lapponica baueri*	VU	VU		
Bar-tailed Godwit (northern Siberian subspecies) *Limosa lapponica menzbieri*	CR	VU		
Eastern Curlew *Numenius madagascariensis*	CR	VU		
	Geering, A., Agnew, L. and Harding, S. (2007). *Shorebirds of Australia*. CSIRO Publishing, Collingwood, Australia. Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. CSIRO Publishing, Collingwood, Australia.			

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
	Chatto, R. (2003). *The distribution and status of shorebirds around the coast and coastal wetlands of the Northern Territory*. Technical Report 73, Parks and Wildlife Commission of the Northern Territory, Darwin. https://dtc.nt.gov.au/__data/assets/pdf_file/0008/279917/2003_shorebirds_rpt76.pdf . Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. CSIRO Publishing. Collingwood, Australia. Geering, A., Agnew, L. and Harding, S. (2007). *Shorebirds of Australia*. CSIRO Publishing, Collingwood, Australia. Marchant, S. and Higgins, P. (eds.) (1993). *Handbook of Australian, New Zealand and Antarctic Birds. Vol. 2 - Raptors to Lapwings*. Oxford University Press, Melbourne, Victoria Wilson, J.R., Nebel, S. and Minton, C.D.T. (2007). Migration ecology and morphometrics of two Bar-tailed Godwit populations in Australia. *Emu*, Vol. 107, pp. 262–274. Ward, S. (2012). *Threatened Species of the Northern Territory –Bar-tailed Godwit – Limosa lapponica*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0008/373544/bar-tailed-godwit.pdf . Chatto, R. (2003). *The distribution and status of shorebirds around the coast and coastal wetlands of the Northern Territory*. Technical Report 73, Parks and Wildlife Commission of the Northern Territory, Darwin. https://dtc.nt.gov.au/__data/assets/pdf_file/0008/279917/2003_shorebirds_rpt76.pdf . Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. CSIRO Publishing. Collingwood, Australia. Geering, A., Agnew, L. and Harding, S. (2007). *Shorebirds of Australia*. CSIRO Publishing, Collingwood, Australia.		
White-throated Grasswren *Amytornis woodwardi*	VU	VU	**Habitat:** Confined to hummock grasslands, sometimes with open shrubland or woodland overstorey, mixed among dense boulder fields or sandstone pavements (Schodde 1982; Noske 1992) and escarpment drainage lines. **Distribution**: NT only – patchily distributed from Nitmuluk National Park to western Arnhem Lank (Noske 1992).	**NONE** • No preferred sandstone or escarpment habitat within the study area
	Noske, R. (1992). The status and ecology of the white-throated grass-wren Amytornis woodwardi. Emu, Vol. 92, pp. 39-51. Schodde, R. (1982). The fairy-wrens - A monograph of the Maluridae. Landsdowne Editions, Melbourne.			
Yellow Chat (Alligator River subspecies) *Epthianura crocea tunneyi*	EN	EN	**Habitat:** Grassy floodplain depressions and channels, concentrating around refugial waterholes at the end of the dry season (Armstrong 2004). **Distribution:** Top End of the NT, where restricted to a small number of sites in the floodplains from the Adelaide River to the East Alligator River (Woinarski & Armstrong 2006).	**NONE** • No preferred grassy floodplain habitat within the study area
	Armstrong, M. (2004). *The yellow chat Epthianura crocea tunneyi in Kakadu National Park*. Report to Parks Australia (North), NT Department of Infrastructure Planning and Environment, Darwin. Woinarski, J. and Armstrong, M. (2006). *Threatened Species of the Northern Territory - Yellow Chat (Alligator River subspecies) - Epthianura crocea tunneyi*. Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0019/206344/yellow-chat.PDF [Accessed 1 May 2018]. Schodde, R. and Mason, I.J. (1999). *The Directory of Australian Birds: Passerines*. CSIRO Publishing, Melbourne.			
Red Goshawk *Erythrotriorchis radiatus*	VU	VU	**Habitat:** Prefers tall, open Eucalypt forest and riparian areas. Nests in large trees, frequently the tallest and most massive in a tall stand, nest trees are invariably within 1 km of permanent water (Debus & Czechura 1988; Aumann & Baker-Gabb 1991). Rarely breeds in areas with fragmented native vegetation (Aumann & Baker-Gabb 1991; Czechura 2001). Home range of up to 200 km^2 (Czechura & Hobson 2000). **Distribution:** Solitary and secretive hawk that is sparsely distributed across much of northern Australia, from the Kimberley in WA to south-eastern Qld. Within this range, generally confined to taller forests characteristic of higher rainfall coastal and sub-coastal areas (Debus 1998), but there are some isolated records of wandering birds from central Australia (Woinarski 2006).	**LOW** • No preferred tall forest or large river nesting habitat within the study area • Naturally large home range of up to 200km^2, thus potential use of the study area for vagrant foraging only

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
	Aumann, T. and Baker-Gabb, D. (1991). *A Management Plan for the Red Goshawk*. RAOU Report 75, Royal Australasian Ornithologists Union, Melbourne. Czechura G.V. and Hobson R.G. (2000). *The Red Goshawk* Erythrotriorchis radiatus *in northern Queensland: status and distribution*. Report to Queensland Parks and Wildlife Service. Czechura G.V. (2001). *The status and distribution of the Red Goshawk* Erythrotriorchis radiatus *on Cape York Peninsula, Queensland*. Unpublished report to Birds Australia. Debus, S. and Czechura, G. (1988). Field identification of the Red Goshawk *Erythrotriorchis radiatus. Australian Bird Watcher*, Vol. 12, pp. 154-159. Debus, S. (1998). *The Birds of Prey of Australia.* Oxford University Press, Melbourne. Woinarski, J. (2006). *Threatened Species of the Northern Territory - Red Goshawk - Erythrotriorchis radiatus*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0018/206352/red-goshawk.pdf .		
Gouldian Finch *Erythrura gouldiae*	EN	VU	**Habitat:** Prefers areas with an adequate supply of seed from annual and perennial grasses (especially *Sorghum*), a nearby source of surface water and – in the breeding season – unburnt, hollow-bearing Eucalyptus trees (especially *E. tintinnans, E. brevifolia* and *E. leucophloia*) (Tidemann 1996; O'Malley 2006). **Distribution:** Patchily distributed across northern Australia from the Kimberley to north-central Qld (Dostine 1998; Franklin et al. 1999; Barrett et al. 2003; Franklin et al. 2005). In the NT, most known breeding populations occur in the Top End. Non-breeding birds disperse widely (Garnett et al. 2011), greatly increasing the possible range of this species.	**LOW** • No preferred nesting habitat, but suitable foraging habitat • Rarely recorded in the Darwin region • Potential for occasional sightings
	Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). *The New Atlas of Australian Birds*. Royal Australian Ornithologists Union, Melbourne, Victoria. Dostine, P. (1998). *Gouldian Finch Recovery Plan Erythrura gouldiae*. Gouldian Finch Recovery Team and Parks & Wildlife Commission NT, Darwin. Franklin, D.C., Burbidge, A.H. and Dostine, P.L. (1999). The harvest of wild birds for aviculture: an historical perspective on finch trapping in the Kimberley with special emphasis on the Gouldian Finch. *Australian Zoologist,* Vol. 31, pp. 92-109. Franklin, D.C., Whitehead, P.J., Pardon, G., Matthews, J., McMahon, P. and McIntyre, D. (2005). Geographic patterns and correlates of the decline of granivorous birds in northern Australia. *Wildlife Research*, Vol. 32, pp. 399-408. Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. CSIRO Publishing. Collingwood, Australia. O'Malley, C. (2006). *National Recovery Plan for the Gouldian Finch (Erythrura gouldiae*). WWF-Australia, Sydney and Parks and Wildlife NT, Department of Natural Resources, Environment and the Arts, NT Government, Palmerston. Tidemann, S.C. (1996). Causes of the decline of the Gouldian Finch *Erythrura gouldiae*. *Biological Conservation International*, Vol. 6, pp. 49-61.		
Grey Falcon *Falco hypoleucos*	-	VU	**Habitat:** Occurs in areas of lightly-timbered lowland plains, typically on inland drainage systems, where the average annual rainfall is less than 500 mm (Ward 2012). **Distribution:** Sparsely distributed through much of the arid and semi-arid areas of Australia but is recorded in all Australian mainland states and territories. In the NT, the majority of records are from the southern half, but there are records all the way up to Darwin (Ward 2012).	**LOW** • Suitable foraging habitat. However, study area receives higher rainfall than preferred by the species • Potential only for vagrant foraging within the study area
	Ward, S. (2012). Threatened Species of the Northern Territory - Grey Falcon - Falco hypoleucos. Northern Territory Department of Environment and Natural Resources. [online] Available at:https://nt.gov.au/__data/assets/pdf_file/0020/206354/grey-falcon.pdf [Accessed 30 May 2017].			
Crested Shrike-tit (northern subspecies) *Falcunculus frontatus whitei*	VU	-	**Habitat:** Recorded in eight different woodland types in northern Australia, mainly those dominated by *Eucalyptus miniata, E. tetrodonta* or *C. bleeseri* (DSEWPaC 2013c; Robinson & Woinarski 1992). Nests have been found in the canopy of *E.*	**NONE** • Study area is outside the documented distribution of the species

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
			tectifica, C. grandifolia and *C. latifolia* at >12 m above the ground in open woodland habitat (Ward et al. 2009). **Distribution:** North-western Australia from the Kimberley in WA, across the Top End of the NT to Borroloola (TSSC 2016). In the NT, recorded in very low densities in many isolated sub-populations (Garnett & Crowley 2000) between north-east Arnhem Land and semi-arid Victoria River District. Scarcity of records suggests that populations are at very low density (Woinarski 2004). Not known to have disappeared from any area where recorded historically (TSSC 2016).	
	Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC). (2013). Falcunculus frontatus whitei in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. [online] Available from: http://www.environment.gov.au/sprat. Garnett, S.T. and Crowley, G.M. (2000). *The Action Plan for Australian Birds 2000*. Environment Australia and Birds Australia, Canberra, ACT. Robinson, D. and Woinarski, J.C.Z. (1992). 'A review of records of the Northern Shrike-tit *Falcunculus frontatus whitei* in north-western Australia'. *South Australian Ornithologist*, Vol. 31, pp. 111-117. Threatened Species Scientific Committee (2016). *Approved Conservation Advice for Falcunculus frontatus whitei - crested shrike-tit (northern)*. Canberra: Department of the Environment. In effect under the EPBC Act from 02-May-2016. Available at: http://www.environment.gov.au/biodiversity/threatened/species/pubs/26013-conservation-advice-05052016.pdf [Accessed 1 May 2018]. Ward, S.J., Berghout, M. & Baker, B. (2009). Notes on the form and habitat of nests of the Northern Shrike-tit. *Northern Territory Naturalist,* Vol. 21, pp. 54-60. Woinarski, J.C.Z. (2004). *National multi-species Recovery Plan for the Partridge Pigeon [eastern subspecies] Geophaps smithii smithii; crested shrike-tit [northern (sub)-species] Falcunculus (frontatus) whitei; masked owl [north Australian mainland subspecies] Tyto novaehollandiae kimberli; and masked owl [Tiwi Islands subspecies] Tyto novaehollandiae melvillensis, 2004-2008*. NT Department of Infrastructure Planning and Environment, Darwin.		
Christmas Frigatebird *Fregata andrewsi*	EN	-	**Habitat:** Inhabits tropical waters of the Indian Ocean. Nests in tall trees, also sometimes on the slope of the inland cliff or higher up on the terraces (Gibson-Hill 1947). **Distribution**: Breeds only on Christmas Island. In non-breeding season, disperses mostly to south-east Asia and Indian Ocean (Marchant et al. 1990). The few NT records are of small numbers of birds seen in during the wet season over the Darwin coastline – usually during north-westerly winds (including McKean et al. 1975).	**NONE** • No suitable habitat in the study area
	Gibson-Hill, C.A. (1947). Notes on the birds of Christmas Island. Bulletin of the Raffles Museum, Vol. 18, pp.87-165. Marchant, S. and Higgins, P.J. (eds.) (1990). Handbook of Australian, New Zealand and Antarctic Birds: Volume 1 - Ratites to Ducks. Oxford University Press, Melbourne, Victoria McKean, J.L., Bartlett, M.C. and Perrins, C.M. (1975). New records from the Northern Territory. Australian BirdWatcher, Vol. 6, pp. 45-46.			
Partridge Pigeon (eastern sub-species) *Geophaps smithii smithii*	VU	VU	**Habitat:** Open forests and woodlands with an understorey of grasses (Woinarski 2006). Prefers woodland dominated by *Eucalyptus tetrodonta* and *E. miniata* (Braithwaite 1985; Garnett et al. 2011; Higgins & Davies 1996). According to Fraser (2001), favour a structurally-patchy savanna understorey at a relatively intricate scale. In all seasons, prefer to feed in areas that have an open ground layer (e.g. following fire); however, more likely to nest where there is dense vegetation cover. Require the seeds of certain perennial grasses and sedges that are available early in the wet season when seed is otherwise scarce, particular the perennial grass species *Alloteropsis semialata* and *Chrysopogon*. The presence of these grasses may be crucial for survival at this time (Fraser 2001). Largely	**MEDIUM** • Suitable Eucalyptus woodland habitat in the study area • Not recorded during camera surveys for this project • Recent records from Blackmore Peninsula 20km east of the study area and ML1148 20km west of the study area

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
			sedentary; however, can travel distances of 5 to 10 km in the wet season on search of food and water resources (Fraser 2001). Home ranges vary seasonally between 8 – 31 hectares Fraser (2001). **Distribution:** Historically, across the Top End (from Kununurra in WA to Borroloola in the NT). Since early 20th century a severe range contraction from the western, eastern and southern parts of the former distribution (Higgins & Davies 1996; Woinarski et al. 2007). Currently, distribution is limited to sub-coastal NT from Yinberrie Hill in the south, Litchfield NP in the west and (western) Arnhem Land in the east (Garnett et al. 2011).	
	Braithwaite, R.W. (1985). *The Kakadu fauna survey: an ecological survey of Kakadu National Park*. Australian National Parks & Wildlife Service, Canberra. Fraser, F. (2000). Species profile: Partridge Pigeon Geophaps smithii. *Northern Territory Naturalist* 16, 38-39. Fraser, F., Lawson V., Morrison S., Christophersen P., McGregor S. and Rawlinson M. (2003). Fire management experiment for the declining partridge pigeon, Kakadu National Park. *Ecological Management and Restoration* 4, 94–102. Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. Birds Australia, CSIRO Publishing, Melbourne. Higgins, P.J. and Davies S.J.J.F. (eds) (1996). *Handbook of Australian, New Zealand and Antarctic Birds. Volume Three: Snipe to Pigeons*. Oxford University Press. Melbourne, Victoria. Department of Environment, Parks and Water Security (2021). *Threatened Species of the Northern Territory - Partridge Pigeon (eastern subspecies) - Geophaps smithii smithii* Northern Territory Government [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0003/206355/partridge-pigeon.pdf [Accessed 1 May 2018]. Woinarski, J., Pavey, C., Kerrigan, R., Cowie, I. and Ward, S. (Eds) (2007). *Lost from Our Landscape: Threatened Species of the Northern Territory*. Northern Territory Government, Darwin.			
Australian Painted Snipe *Rostratula (benghalensis) australis*	EN	VU	**Habitat:** Fringes of permanent and temporary wetlands, swamps and inundated grasslands (Taylor et al. 2013). **Distribution:** Nomadic and scattered across Australia with no predictable occurrence (Rogers 2001), but could occur at any wetland or inundated grassland across its distribution, including nearly all of the NT and Qld (Garnett et al. 2011).	**LOW** • No suitable habitat within the study area
	Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. CSIRO Publishing. Collingwood, Australia. Rogers, D. (2001). Painted Snipe. *Wingspan*, Vol. 11 (No. 4), pp. 6-7. Taylor, R., Chatto, R. and Woinarski, J.C.Z. (2013). *Threatened Species of the Northern Territory - Australian painted snipe - Rostratula australis*. Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0018/206361/australian-painted-snipe.pdf [Accessed 1 May 2018].			
Masked Owl (northern subspecies) *Tyto novaehollandiae kimberli*	VU	VU	**Habitat:** Mainly in *Eucalyptus* tall open forests (especially those dominated by *Eucalyptus miniata* and *E. tetrodonta*), but also roosts in monsoon rainforests and forages in more open vegetation types, including grasslands (Woinarski & Ward 2012). Usually nests in tree hollows, within patches of closed forest (Garnett et al. 2011). Little else known about the subspecies, but the species in general is resident in pairs within a territory up to 3,000 hectares (Debus 2009). Nest in large hollows with an entrance more than 20 cm wide and that is greater than 10 m above the ground (Debus 2009). Breeding poorly known, but thought to occur between March and October (DEWHA 2010). **Distribution:** Poorly known, with few records from across a broad range in northern Australia. In the NT, records from the Top End, Kakadu, Coburg	**LOW** • Potentially suitable foraging habitat in the study area • Despite substantial survey effort in the Greater Darwin region there are no recent records

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
			Peninsula (majority of records) and south-west Gulf country (Woinarski & Ward 2012).	
	Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). The Action Plan for Australian Birds 2010. CSIRO Publishing. Collingwood, Australia. Woinarski, J.C.Z. and Ward, S. (2012). *Threatened Species of the Northern Territory - Masked Owl (north Australian mainland subspecies) - Tyto novaehollandiae kimberli.* Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/word_doc/0008/373553/masked-owl-mainland-top-end.docx.			
MAMMALS (TERRESTRIAL)				
Fawn Antechinus *Antechinus bellus*	VU	EN	**Habitat**: Mostly in open forests and woodlands dominated by *Eucalyptus miniata* and/or *E. tetrodonta*, particularly where these forests have a relatively dense shrubby understorey (Friend 1985; Friend & Taylor 1985). Declines in areas with frequent intense fires (Corbett et al. 2003) but not necessarily common in areas where fire has been excluded for long periods (>20 years; Woinarski et al. 2004). Breeding occurs mid-June to late August, after which a synchronous male die-off occurs (TSSC 2015). **Distribution:** Restricted to the Top End of the NT (Watson & Calaby 2008), with one record from Melville Island. Recent surveys have failed to record it across central and eastern Arnhem Land (TSSC 2015). One recent record from Blackmore Peninsula.	**LOW** • Potential *Eucalyptus* woodland habitat within the study area; however, the lack of a dense shrubby understorey and high fire frequency reduce habitat suitability • Significant range reduction in the past few decades, with only two records from the Darwin region despite significant survey effort
	Corbett L. K., Andersen, A.N. and Muller, W.J. (2003). Terrestrial vertebrates. In: Andersen, A.N., Cook, G.D. and Williams, R.J. (eds.). Fire in Tropical Savannas: The Kapalga Experiment. Springer-Verlag, New York: pp. 126–152. Friend, G.R. and Taylor, J.A. (1985). Habitat preferences of small mammals in tropical open-forest of the Northern Territory. Australian Journal of Ecology, Vol. 10, pp. 173-185. Friend, G.R. (1985). Ecological studies of a population of Antechinus bellus (Marsupalia: Dasyuridae) in tropical Australia. Australian Wildlife Research, Vol. 12 (No. 2), pp. 151-162. Threatened Species Scientific Committee (2015). Approved Conservation Advice for Antechinus bellus – Fawn Antechinus. Canberra: Department of the Environment. In effect under the EPBC Act from 03-Dec-2015. Available at: http://www.environment.gov.au/biodiversity/threatened/species/pubs/344-conservation-advice-2015123.pdf. Watson, M.L. and Calaby, J.H. (2008). Fawn Antechinus: Antechinus bellus. In: Van Dyck, S. and Strahan, R. (eds.). The Mammals of Australia: 3rd Edition. Reed New Holland, Sydney. Woinarski, J.C.Z., Risler, J. and Kean, L. (2004). The response of vegetation and vertebrate fauna to 23 years of fire exclusion in a tropical Eucalyptus open forest, Northern Territory, Australia. Austral Ecology, Vol. 29, pp. 156–176.			
Brush-tailed Rabbit-rat *Conilurus penicillatus*	VU	EN	**Habitat:** Largely restricted to mixed *Eucalypt* open forest and woodland, or on dunes with *Casuarina* – seeming to prefer habitats that are not burnt annually, that have an understorey of predominantly perennial grasses and a sparse-to-moderate middle storey (Firth et al. 2006; Firth 2007; Kemper & Firth 2008). **Distribution:** Formerly widespread across northern Australia, but has declined extensively from Qld and lower rainfall areas of the Kimberley in WA and the Top End in the NT. No recent records from much of the historically-recorded NT range between near the mouth of Victoria River (in the west) and Sir Edward Pellew Island group (in east). Most recently known from Cobourg Peninsula, Tiwi Islands, Groote Eylandt and a small area within Kakadu National Park (Woinarski & Hill 2012).	**NONE** • No recent records in the Darwin region • This species appears to be restricted to Coburg Peninsula and Kakadu National Park on the mainland
	Firth, R.S.C. (2007). *Ecology and conservation status of the brush-tailed rabbit-rat Conilurus penicillatus*. PhD thesis, Charles Darwin University, Darwin, Northern Territory.			

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
	Firth, R.S.C., Woinarski, J.C.Z. and Noske, R.A. (2006). Home range and den characteristics of the brush-tailed rabbit-rat *Conilurus penicillatus* in the monsoonal tropics of the Northern Territory, Australia. *Wildlife Research*, Vol. 33, pp. 397-408. Kemper, C.M. and Firth, R.S.C. (2008). Brush-tailed Rabbit-rat. In: Van Dyck, S. and Strahan, R. (eds). *The Mammals of Australia*. Reed New Holland, Chatswood, NSW. Woinarski, J.C.Z. and Hill, B. (2012). *Threatened Species of the Northern Territory - Brush-tailed rabbit-rat, Brush-tailed tree-rat - Conilurus penicillatus*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0016/205504/brush-tailed-rabbit-rat.pdf .			
Northern Quoll *Dasyurus hallucatus*	EN	CR	**Habitat:** Wide range of habitats, but since the arrival of Cane Toads generally restricted to the most suitable habitats which are rocky upland areas with numerous crevices and rock piles (Van Dam et al. 2002). Prime habitat in the NT consists of rocky sandstone escarpments and outliers (Braithwaite & Griffiths 1994). Home range varies from 35 to 100 ha (Oakwood 2002). Breeding occurs in May and June, with male die-off occurring shortly afterwards (Oakwood 2000). **Distribution:** Historically occurred in the NT from Borroloola in the south-east as far west as the NT/WA border (Woinarski et al. 2007), and extends into the Kimberley and Pilbara regions of WA. Dramatic range contraction and population crash associated with Cane Toad invasion. Now occurs across northern Australia in five regional populations – including the Top End in the NT.	**LOW** • Suitable habitat, but no refugial rocky habitat within the study area • The species has experienced significant range contraction since Cane Toad invasion
	Braithwaite, R.W. and Griffiths, A.D. (1994). Demographic variation and range contraction in the Northern Quoll, *Dasyurus hallucatus* (Marsupialia: Dasyuridae). *Wildlife Research,* Vol. 21, pp. 203-218. Oakwood, M. (2000). Reproduction and demography of the northern quoll, *Dasyurus hallucatus*, in the lowland savanna of northern Australia. *Australian Journal of Zoology*. 48:519-539. Oakwood, M. (2002). Spatial and social organization of a carnivorous marsupial, *Dasyurus hallucatus*. *Journal of Zoology*, London. 257:237-248. Van Dam, R.A., Walden, D.J. and Begg, G.W. (2002). *A preliminary risk assessment of cane toads in Kakadu National Park*. Supervising Scientist Report 164, Darwin, Northern Territory. Woinarski, J.C.Z., Rankmore, B.R., Fisher, A. and Milne, D. (2007). *The natural occurrence of northern quolls Dasyurus hallucatus on islands of the Northern Territory: assessment of refuges from the threat posed by cane toads Bufo marinus.* Report to Natural Heritage Trust.			
Arnhem Leaf-nosed Bat *Hipposideros inornatus*	EN	VU	**Habitat:** Caves or abandoned mine sites in cool draughty areas, close to water (Churchill 1998; Corbett & Richards 2002). Reported as foraging in riparian areas and in Eucalypt tall open forests (Woinarski & Milne 2015). **Distribution:** Restricted to the NT and only known to occur on the western Arnhem Land sandstone massif (Deaf Adder Gorge and upper South Alligator River area) and from one site – Tolmer Falls – in Litchfield National Park (McKean & Hertog 1979) where population appears to be disappearing (Woinarski & Milne 2015).	**LOW** • Potential foraging habitat, but no caves/abandoned mine sites in the study area
	Churchill, S. (1998). *Australian Bats*. Reed New Holland, Sydney. Corbett, L. and Richards, G. (2002). *Bat survey: Gunlom land trust area*. Report to Parks Australia North, EWL Sciences, Darwin. McKean, J.L. and Hertog, A.L. (1979). Extension of range in the horseshoe bat. *Northern Territory Naturalist,* Vol. 1, p. 5. Woinarski, D. and Milne, D. (2015). *Threatened Species of the Northern Territory – Arnhem Leaf-nosed Bat – Hipposideros inornata.* Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0018/205524/arnhem-leaf-nosed-bat.pdf [Accessed 1 May 2018].			
Ghost Bat *Macroderma gigas*	VU	-	**Habitat:** Ranging from the arid Pilbara of WA to tropical savanna woodlands and north Qld. rainforests (TSSC 2016). Permanent roost sites are generally deep natural caves or disused mines (TSSC 2016). Move between a number of caves seasonally or as dictated by weather conditions, and require a range of cave sites	**LOW** • Potential foraging habitat, but no deep cave/abandoned mine habitat for permanent roost sites within the study area

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
			(Hutson et al. 2001). Most breeding sites are caves with multiple entrances (TSSC 2016). **Distribution:** Geographically-disjunct colonies occur in the Pilbara and Kimberley in WA, NT north of approximately 17° latitude (including Elcho Island and Groote Eylandt), the Gulf of Carpentaria, eastern Qld from Cape York to near Rockhampton, and western Qld (including Riversleigh and Camooweal districts) (TSSC 2016). Distribution likely influenced by the availability of suitable caves and mines for roost sites (Ward & Milne 2016). Only 14 breeding sites known (Worthington Wilmer 2012). Disperse widely when not breeding (TSSC 2016). In arid Australia, including southern NT until the early 1960's (Ward & Milne 2016).	
	Hutson, A. M., Mickleburgh, S. P. & Racey, P. A. (2001) Microchiropteran Bats - Global Status Survey and Conservation Action Plan. IUCN/SSC Chiroptera Specialist Group, Gland, Switzerland and Cambridge, U.K. Milne, D. and Ward, S. (2016). *Threatened Species of the Northern Territory – Ghost Bat - Macroderma gigas*. Northern Territory Department of Environment and Natural Resource. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0010/376138/ghost-bat.pdf [Accessed 1 May 2018]. Threatened Species Scientific Committee (2016). *Approved Conservation Advice for Macroderma gigas (ghost bat).* Canberra: Department of the Environment. Available at:http://www.environment.gov.au/biodiversity/threatened/species/pubs/174-conservation-advice-05052016.pdf [Accessed 1 May 2018]. Worthington Wilmer, J. (2012). Ghost Bat *Macroderma gigas*. In: Curtis et al. (eds.). *Queensland's Threatened Animals*. CSIRO, Canberra: pp. 382-383.			
Black-footed Tree-rat (Kimberley and mainland NT subspecies) *Mesembriomys gouldii gouldii*	EN	VU	**Habitat:** Woodlands and open forests with large trees and a moderately diverse mid-storey in near-coastal areas. Generally, require fruit and seed resources including *Pandanus* fruits, and fruiting trees and shrubs (Rankmore 2006). Shelters in tree hollows and occasionally *Pandanus* (Hill 2012). Thought to be more prevalent in woodlands with infrequent and low intensity fires (Price et al. 2005). **Distribution:** Top End of NT, Kimberley region of WA and Cape York Peninsula south to Townsville in Qld. (Hill 2012). Has remained relatively abundant in the Darwin rural area and there are some recent records from Gunn Point (Price et al. 2005), the Lee Point Area, Middle Arm Peninsula and Blackmore Peninsula.	**KNOWN** • Suitable habitat in the study area • Recent records from east and west of the study area • Detected during camera trapping within the study area
	Department of Environment, Parks and Water Security (2021) *Threatened Species of the Northern Territory – Black-footed Tree-rat (Kimberley and mainland Northern Territory).* Northern Territory Government. https://nt.gov.au/__data/assets/pdf_file/0018/205515/black-footed-tree-rat-kimberley-mainland-nt.pdf [Accessed 31 Jan 2022] Price, O., Rankmore, B., Milne, D.J., Brock, C., Tynan, C., Kean, L. and Roger, L. (2005). Regional patterns of mammal abundance and their relationships to landscape variables in eucalypt woodlands near Darwin, northern Australia. *Wildlife Research*, Vol. 32, pp. 435-446. Rankmore, B.R. 2006. *Impacts of Habitat Fragmentation on the Vertebrate Fauna of the Tropical Savannas of Northern Australia; with Special Reference to Medium-sized Mammals*. PhD Thesis, Charles Darwin University, Darwin.			
Nabarlek (Top End subspecies) *Petrogale concinna canescens*	CR	EN	**Habitat:** Isolated and rocky areas consisting of both sandstone and granite escarpments (Churchill 1997; Telfer et al. 2008). Shelters in caves and crevices during the day (Churchill 1997) and may move from these to forage in adjacent flat areas (Sanson et al. 1985). **Distribution:** Restricted to the Top End of the NT in scattered populations from sandstone cliffs bordering the Arafura Swamp (Arnhem Land) in the east, to the Daly River catchment in the west (Ward & Woinarski 2012).	**NONE** • No suitable sandstone or granite escarpment habitat within the study area • Range contraction away from the study area

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
	Churchill, S. (1997). Habitat use, distribution and conservation status of the Nabarlek, Petrogale concinna, and sympatric rock-dwelling mammals, in the Northern Territory. Australian Mammalogy, Vol. 19, pp. 297-308. Sanson, G.D., Nelson, J. and Fell, P. (1985). Ecology of Peradorcas concinna in Arnhem Land in a wet and a dry season. Proceedings of the Ecological Society of Australia, Vol. 13, pp. 65-72. Telfer, W.R., Griffiths, A.D. and Bowman, D.M.J.S. (2008). The habitat requirements of four sympatric rock-dwelling macropods of the Australian monsoon tropics. Austral Ecology, Vol. 33, pp. 1033-1044. Ward, S. and Woinarski, J. (2012). Threatened Species of the Northern Territory - Nabarlek - Petrogale concinna. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0017/205523/nabarlek.pdf .			
Northern Brush-tailed Phascogale *Phascogale pirata*	VU	EN	**Habitat:** No detailed studies, but ecology is probably similar to that reported for phascogales in southern Australia (Rhind 1998). Most records are from tall open forests dominated by Eucalyptus miniata and E. tetrodonta (Rhind et al. 2008). Brush-tailed Phascogales are primarily arboreal and seldom feed on the ground. **Distribution:** Probably occurs naturally in low densities (Woinarski et al. 2014). Very few records exist; reported from West Island, east Arnhem Land, Coburg Peninsula, Kakadu, Litchfield and the Tiwi Islands. In the last 10 years only recorded from Kakadu, Coburg Peninsula and the Tiwi Islands, despite many extensive wildlife surveys across regions of the Top End during that time (Woinarski et al. 2014).	**LOW** • Woodland habitat on site may be marginal for the species, which prefers taller denser vegetation • Range contraction to east of Kakadu on the mainland • Despite substantial survey effort in the Greater Darwin region there are no recent records
	Rhind, S.G. (1998). Ecology of the brush-tailed phascogale in jarrah forest of south-western Australia. PhD thesis, Murdoch University, Perth, Western Australia. Rhind, S.G., Woinarski, J. and Aplin, K.P. (2008). Brush-tailed Phascogale. In: Van Dyck, S. and Strahan, R. (eds). The Mammals of Australia. Reed New Holland, Chatswood, NSW. Woinarski, J., Burbidge, A. and Harrison, P. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing: pp. 125-127.			
Bare-rumped Sheath-tailed Bat *Saccolaimus saccolaimus (nudicluniatus)*	VU	-	**Habitat:** In the NT, specimens have been collected from Pandanus woodland fringing the sedgelands of the South Alligator River and Eucalypt tall open forests (Friend & Braithwaite 1986; Churchill 1998) with more recent records from Howard Springs (Milne et al 2009). Most records occur within near-coastal habitats with one recent exception (Jasper Gorge) 150 km inland (Woinarski et al. 2014). **Distribution:** Widely distributed from India through south-east Asia to the Solomon Islands, with few records across north-eastern Qld and the NT, suggesting a fragmented distribution. The north-eastern Australian population is described as the subspecies *S. s. nudicluniatus*, although it is not clear whether this should be applied to NT populations (Milne & Woinarski 2006).	**MEDIUM** • Suitable habitat within study area • Despite substantial survey effort in the Greater Darwin region there are few recent records
	Churchill, S. (1998). *Australian Bats*. Reed New Holland, Sydney. Friend, G.R. and Braithwaite, R.W. (1986). Bat fauna of Kakadu National Park, Northern Territory. *Australian Mammalogy*, Vol. 9, pp. 43-52. Milne, D.J., Jackling, F.C., Sidhu, M., and Appleton, B.R. (2009). Shedding new light on old species identifications: morphological and genetic evidence suggest a need for conservation status review of the critically endangered bat, Saccolaimus saccolaimus. Wildlife Research36: 496–508. Milne, D. and Woinarski, J. (2006). *Threatened Species of the Northern Territory - Bare-rumped Sheathtail Bat - Saccolaimus saccolaimus*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0007/376117/bare-rumped-sheathtail-bat.pdf [Accessed 1 May 2018]. Woinarski, J., Burbidge, A. and Harrison, P. (2014). *The Action Plan for Australian Mammals 2012*. CSIRO Publishing: pp. 511-514.			
Northern Brushtail Possum	VU	NT	**Habitat:** In Northern Australia, mainly tall eucalypt open forests with large, hollow-bearing trees, some mangrove communities, rainforests and semi-urban areas	**KNOWN** • Suitable habitat within the study area

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
Trichosurus vulpecula arnhemensis			(TSSC 2001). Found in higher abundance when shrub density is high, particularly shrubs that bear large, fleshy fruits (Stobo-Wilson 2019. Kerle 1985, Friend et al 1985). **Distribution:** Occurs from the Gulf of Carpentaria, NT to the Kimberley, WA. Also occurs on many NT islands, but not on any WA islands. Within its range, distribution is patchy (TSSC 2021). Recently, there have been broad-scale losses and reduction in extensive areas of the NT range (Woinarski 2004; Woinarski et al. 2011; Gibson & McKenzie 2012; Ziembicki et al. 2013; Stobo-Wilson et al. 2019).	• Recent records from Blackmore Peninsula 20km east of the study area and ML1148 20km west of the study area • Detected during camera trapping within the study area
	Friend G & Taylor J (1985) Habitat preferences of small mammals in tropical open-forest of the Northern Territory. *Australian Journal of Ecology 10*, 173-185. Gibson L & McKenzie N (2012) Occurrence of non-volant mammals on islands along the Kimberley coast of Western Australia. *Records of the Western Australian Museum supplement 81*, 15-39 Kerle J (1985) Habitat preference and diet of the northern brushtail possum *Trichosurus arnhemensis* in the Alligator Rivers Region, N.T. *Proceedings of the Ecological Society of Australia 13*, 161-176. Kerle, J., Foulkes, J., Kimber, R. and Papenfus, D. (1992). The decline of the brushtail possum, *Trichosurus vulpecula* (Kerr 1798), in arid Australia. *Rangelands Journal,* Vol. 14, pp. 107-127. Stobo-Wilson A, Murphy B, & Cremona T (2019) Contrasting patterns of decline in two arboreal marsupials from Northern Australia. *Biodiversity Conservation 28*, 2951 Threatened Species Scientific Committee (2021). *Conservation Advice Trichosurus vulpecula arnhemensis Northern Brushtail Possum*. Canberra: Department of Agriculture, Water and the Environment. Available at: http://www.environment.gov.au/biodiversity/threatened/species/pubs/83091-conservation-advice-11052021.pdf [Accessed 27 January 2022]. Woinarski, J.C.Z. (2004). In a land with few possums, even the common are rare: ecology, conservation and management of possums in the Northern Territory. In: Goldingay, R. and Jackson, S. (eds.). *The biology of Australian possums and gliding possums*. Surrey Beatty & Sons, Sydney: pp.51- 62. Woinarski J, Ward S, Mahney T, Bradley J, Brennan K, Ziembicki M & Fisher A (2011) The mammal fauna of the Sir Edward Pellew Islands, Northern Territory: refuge and death-trap. *Wildlife Research 38*, 307-322. Ziembicki M, Woinarski J & Mackey B (2013) Evaluating the status of species using Indigenous knowledge: novel evidence for major native mammal declines in northern Australia. *Biological Conservation 157*, 78-92.			
False Water Rat *Xeromys myoides*	VU	-	**Habitat:** Utilises both intertidal and freshwater habitats, with most records from mangrove forests, saltmarsh, sedgelands, clay pans and freshwater *Melaleuca* wetlands (DoE 2017). **Distribution:** Three regions of coastal Australia: the NT, central south Qld and south-east Qld (DoE 2017). In the NT, known only from coastal Top End with ten records at six sites – South Alligator River in 1903, Daly River floodplain in 1972, two sites on the Tomkinson River in 1975, Melville Island in 1975 and Glyde River floodplain in 1998 and 1999 (Cole & Woinarski 2002, Woinarski 2006).	**LOW** • No suitable habitat within the study area
	Cole, J. and Woinarksi, J. (2002). *Field Guide to the Rodents and Dasyurids of the Northern Territory.* Surrey Beatty & Sons, Chpping Norton, NSW. Department of the Environment (2017). *Xeromys myoides - Water Mouse, False Water Rat, Yirrkoo*. Species Profile and Threats Database, Department of the Environment, Canberra. Available at: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66 [Accessed 1 May 2018]. Woinarski, J.C.Z. (2006). *Threatened Species of the Northern Territory - False water-rat, Water mouse - Xeromys myoides*. Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0008/376136/false-water-rat.pdf [Accessed 1 May 2018].			

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
REPTILES (TERRESTRIAL)				
Plains Death Adder *Acanthophis hawkei*	VU	VU	**Habitat:** Floodplains in the Top End and cracking soil plains inland (Webb et al. 2002). **Distribution**: Habitat mapping suggests the potential geographic range extends from western Qld, across the sub-coastal north of the NT to the north-eastern Kimberley of WA. Fragmented populations occur in the Mitchell Grass Downs of western Qld, the Barkly Tablelands on the NT/Qld border and east of Darwin (Fogg Dam) in the NT (TSSC 2012; Wuster et al. 2005). Susceptible to ingesting toxic Cane Toads (Phillips et al. 2009).	**NONE** • No suitable cracking clay habitat within the study area
	Phillips, B.L., Greenlees, M.J., Brown, G.P. and Shine R (2010). Predator behaviour and morphology mediates the impact of an invasive species: cane toads and death adders in Australia. *Animal Conservation*, Vol. 13, pp. 53-59. Webb, J.K., Christian, K.A. and Fisher, P. (2002). Fast growth and early maturation in a viviparous sit-and-wait predator, the northern death adder (*Acanthophis praelongus*) from tropical Australia. *Journal of Herpetology*, Vol. 36, no. 3, pp. 505-509. Wuster, W., Dumbrell, A.J., Hay, C., Pook, C.E., Williams, D.J. and Fry, B.G. (2005). Snakes across the Strait: trans-Torresian phylogeographic relationships in three genera of Australasian snakes (Serpentes: Elapidae: *Acanthophis*, *Oxyuranus*, and *Pseudechis*). *Molecular Phylogenetics and Evolution*, Vol. 34. pp. 1-14. Threatened Species Scientific Committee (2015). *Approved Conservation Advice – Acanthophis hawkei – Plains Death Adder.* Canberra: Department of the Environment. [online] Available at: http://www.environment.gov.au/biodiversity/threatened/species/pubs/83821-conservation-advice.pdf [Accessed 1 May 2018].			
Arnhem Land Skink *Bellatorias obiri*	EN	EN	**Habitat:** Prefers sandstone outcrops, typically with extensive fissures and cave systems (Sadlier 1990). **Distribution:** Restricted to the Western Arnhem Land plateau and outliers (e.g. Jabiluka), where patchily distributed (Armstrong & Dudley 2004).	**NONE** • No sandstone outcrops in the study area
	Armstrong, M. and Dudley, A. (2004). *The Arnhem Land Egernia Egernia obiri in Kakadu National Park*. Report to Parks Australia North, NT Department of Infrastructure Planning and Environment, Darwin. Sadlier, R.A. (1990). A new species of scincid lizard from western Arnhem Land, Northern Territory. *The Beagle*, Vol. 7, pp. 29-33.			
Yellow-snouted Gecko *Lucasium occultum*	EN	VU	**Habitat:** Prefers areas with well-developed leaf litter and grasses (King et al. 1982; Johansen 2006) in open forests dominated by *Eucalyptus miniata* and *E. tetrodonta*. Commonly found in sandy red-loam substrates. Has been recorded in areas consisting of moderate to sparse Gamba grass (Beggs et al. 2012). **Distribution:** Endemic to the NT with known populations from north-west of Kakadu National Park and Wildman Reserve (King et al. 1982).	**NONE** • Restricted to Kakadu and Wildman Reserve
	Beggs, K., Armstrong, M., Woinarski, J. and Ward, S. (2012). *Threatened Species of the Northern Territory - Yellow-Snouted Gecko - Lucasium occultum.* Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0007/206458/yellow-snouted-gecko.pdf [Accessed 1 May 2018]. Johansen, T. (2006). *The yellow-snouted gecko (Diplodactylus occultus), a little known endemic species of northern Australia*. Report to NT Department of Natural Resources Environment and the Arts. King, M., Braithwaite, R.W. and Wombey, J.C. (1982). A new species of *Diplodactylus* (Reptillia: Gekkonidae) from the Alligator Rivers region - Northern Territory. *Transactions of the Royal Society of South Australia,* Vol. 106, pp. 15-18.			
Northern Blue-tongued	CR	-	**Habitat:** Occurs in a variety of habitats, including riparian forest, vine thicket/monsoon rainforest, pandanus-lined gorges, Melaleuca forest, Eucalypt	**LOW**

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
Skink *Tiliqua scincoides intermedia*			woodland, shrublands, and dense grasslands, often in proximity to freshwater sources (DCCEEW 2023, Jolly et al. 2023). Spends much time utilising shaded, cool and moist microhabitats, such as areas of dense shrubs and grasses, deep leaf litter, burrows and rock crevices. These microhabitats are considered critical habitat for the survival for the Northern Blue-tongued Skink - providing food and water resources, and protection from environmental exposure and predation (DCCEEW 2023). **Distribution:** Across northern Australia from Broome in Western Australia to the Gulf of Carpentaria in western Queensland (DCCEEW 2023). Throughout the Top End of the NT south to about Elliott. Once common in suburban Darwin. Cane Toads have caused significant declines in *T. s. intermedia* across northern Australia and the species is now rarely encountered (DCCEEW 2023, Jolly et al. 2023).	• Suitable habitat. Areas of dense shrub and extensive leaflitter present, but absence of freshwater sources. • Highly impacted by Cane Toads, resulting in significant declines. • Nearest recent record from Blackmore Peninsula 14 km east in 2022. • Not detected during camera trapping
	Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023). *Conservation Advice for Tiliqua scincoides intermedia (northern blue-tongue skink).* [online] Available at: https://www.environment.gov.au/biodiversity/threatened/species/pubs/89838-conservation-advice-21122023.pdf [Accessed 13 March 2024]. Jolly, C., Schembri, B., Macdonald, S. (2023), Field Guide to the Reptiles of the Northern Territory. CSIRO Publishing, Collingwood, Victoria.				
Mertens' Water Monitor *Varanus mertensi*	EN	VU	**Habitat:** Semi-aquatic, occupying edges of freshwater watercourses and lagoons, but seldom seen far from water (Christian 2004). **Distribution:** Across far northern Australia from the western Cape York Peninsula in Qld to the Kimberley in WA (Christian 2004). Widespread in the NT, occupying all of the Top End river systems (Ward et al. 2006). The more common water monitor in greater Darwin (outside of Darwin suburbs and coastal area). Susceptible to ingesting toxic Cane Toads resulting in reduced abundance (Griffiths & McKay 2007).	**MEDIUM** • Charlotte River and minor ephemeral creek lines within the study area may provide suitable habitat • Recent record upstream of Charlotte River • Reduced abundance since Cane Toad arrival
	Christian, K. (2004). Varanus mertensi. In: Pianka et al. (eds.). *Varanoid lizards of the world*. Indiana University Press, Bloomington, Indianapolis. Griffiths, A.D. and McKay (2007). Cane toads reduce the abundance and site occupancy of Merten's water monitor (Varanus mertensi). *Wildlife Research,* Vol. 34, pp. 609-615. Ward, S., Woinarski, J., Griffiths, T. and McKay, L. (2006). *Threatened Species of the Northern Territory - Mertens Water Monitor - Varanus mertensi*. Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0018/206460/mertens-water-monitor.pdf [Accessed 1 May 2018].				
Mitchell's Water Monitor *Varanus mitchelli*	CE	VU	**Habitat:** Semi-aquatic and often arboreal, inhabiting margins of freshwater watercourses, swamps and lagoons (Shine 1986). Also found in mangroves. **Distribution:** Top End of the NT and Kimberley in WA (Schultz & Doody 2004). In the NT, recorded in most catchments flowing into the Timor Sea, Arafura Sea and the Gulf of Carpentaria (Ward 2012). The more common water monitor in Darwin suburbs and coastal area. Susceptible to ingesting toxic Cane Toads resulting in reduced abundance (Doody et al. 2009).	**MEDIUM** • Charlotte River and minor ephemeral creek lines within the study area may provide suitable habitat • Suitable mangrove habitat immediately downstream • Reduced abundance since Cane Toad arrival

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
	Doody, J.S., Green, B., Rhind, D., Castellano, C., Sims, R. and Robinson, T. (2009). Population-level declines in Australian predators caused by an invasive species. *Animal Conservation*, Vol. 12, pp. 46-53. Schultz, T. and Doody, S. (2004). Varanus mitchelli. In: Pianka et al. (eds.). *Varanoid lizards of the world*. Indiana University Press, Bloomington, Indianapolis. Shine, R. 1986. Food habits, habitats and reproductive biology of four sympatric species of varanid lizards in tropical Australia. *Herpetologica,* Vol. 42, pp. 346-360. Ward, S. (2012). *Threatened Species of the Northern Territory - Mitchell's Water Monitor - Varanus mitchelli*. Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0019/206461/mitchells-water-monitor.pdf [Accessed 1 May 2018].			
Floodplain Monitor *Varanus panoptes*	-	VU	**Habitat:** Broad range of habitats from coastal beaches to savannah woodlands (Christian 2004). Also common throughout floodplains grasslands and a variety of native woodlands (Ward et al. 2012). **Distribution:** Across northern Australia from the Kimberley in WA to Cape York Peninsula, and southwards through most of Qld. In the NT, recorded across most of the Top End and the Gulf Region (Christian 2004). Highly susceptible to Cane Toad poisoning (Ujvari & Madsen 2009) and has experienced significant declines (Doody et al. 2009).	**LOW** • Suitable habitat in the study area • Reduced abundance since Cane Toad arrival, such that is now rarely recorded in areas infested by toads.
	Christian, K. (2004). Varanus panoptes. In: Pianka et al. (eds). *Varanoid lizards of the world*. Indiana University Press, Bloomington, Indianapolis. Doody, J.S., Green, B., Rhind, D., Castellano, C., Sims, R. and Robinson, T. (2009). Population-level declines in Australian predators caused by an invasive species. *Animal Conservation*, Vol. 12, pp. 46-53. Ujvari, B. & Madsen, T. (2009). Increased mortality of naïve varanid lizards after the invasion of non-native cane toads (*Bufo marinus*). *Herpetological Conservation and Biology*, Vol. 4, pp. 248-251. Ward, S., Woinarski, J., Griffiths, T. & McKay, L. (2012). *Threatened Species of the Northern Territory - Yellow Spotted Monitor, Northern Sand Goanna, Floodplain Monitor - Varanus panoptes.* Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0006/206466/floodplain-monitor.pdf [Accessed 1 May 2018].			
AMPHIBIANS				
Howard Springs Toadlet *Uperoleia daviesae*	-	VU	**Habitat:** Very little is known; however, appears to be confined to sandsheet heathland. Suitable habitat consists of short vegetation and sandy substrates which become inundated during the wet season (Ward et al. 2012). **Distribution**: Endemic to the NT. Confined to sandsheet heathlands in the Howard and Elizabeth River catchments (Ward et al. 2012).	**NONE** • No suitable sandsheet heath habitat in the study area.
	Ward, S., Young, S. and Hill, B. (2012). Threatened Species of the Northern Territory - Howard River Toadlet – Uperoleia daviesae. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0003/205527/howard-river-toadlet.PDF [Accessed 30 May 2017].			
INVERTEBRATES				
Atlas Moth *Attacus wardi*	-	VU	**Habitat:** Coastal monsoon vine forest, where the larval stages feed on the plant *Croton habrophyllus* at the edges of the forest (Lane et al. 2010). **Distribution:** The Top End of the NT, with records from Tiwi and Melville Islands, Darwin, Black Point and Cobourg Peninsula. Also records from Lesuer Island in WA (Braby & Nielsen 2011).	**NONE** • No coastal monsoon vine forest within the study area
	Braby, M.F. and Nielsen, J. (2011). Review of the conservation status of the Atlas Moth, *Attacus wardi* Rothschild, 1910 (Lepidoptera: Saturniidae) from Australia. *Journal of Insect Conservation*, Vol. 15, pp. 603-608.			

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
	Lane, D., Martin, G. and Weir, R.P. (2010). The life history of *Attacus wardi* Rothschild (Lepidoptera: Saturniidae) from the Northern Territory, Australia. *Australian Entomology*, Vol. 37, pp. 115-127.			
FLORA				
a shrub *Atalaya brevialata*	CR	-	**Habitat:** Restricted to foot-slope sites with more open vegetation on deeper, coarser sandy soils, mostly along a specific, distinct geological boundary (Cowie 2014). **Distribution:** Endemic to the NT; found south of Darwin, near Elizabeth River at Virginia, and its tributary – Amy's Creek (Cowie 2014). Few targeted surveys and uncertainty as to the taxonomic distinctness of the species. Extent of occurrence is 7.6 km^2, with a high degree of confidence as it occurs within one of the most heavily-surveyed areas in the NT (Cowie 2014).	**NONE** • Restricted to a small range which is outside the study area
	Cowie, I. (2014). *Threatened Species of the Northern Territory - Atalaya brevialata.* Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0008/376262/atalaya-brevialata.pdf [Accessed 1 May 2018].			
a herb *Cleome insolata*	-	VU	**Habitat:** Inundated sedge land growing on silty loam with coverage of laterite gravels in close proximity to a river catchment (Short 2010). Low open woodlands with *Grevillea pteridifolia, Melaleuca viridiflora, M. nervosa, Verticordia cunninghamii and Pandanus over Dapsilanthus, Eriachne burkittii; Sorghum and Alloteropsis*; on seasonally waterlogged sandy soils. Flowering Jan-Apr (NTH 2020). **Distribution:** Endemic to the NT, known from a population located near Humpty Doo, three populations in Lloyd Creek; from the Noonamah - Amys Creek area; Wishart Rd; near Shoal Bay and in the Darwin rural area (Westaway & Cowie 2012; EcOz records). A species-specific survey has not been carried out (Westaway & Cowie 2012).	**NONE** • Highly restricted range which is outside the project footprint
	Short, P.S. (2010). New species of *Cleome* L. (Cleomaceae) from the Northern Territory, Australia. *The Beagle*, Records of the Museum and Art Galleries of the Northern Territory, 2010, Vol. 26, pp. 1–12. [online] Available at: https://dtc.nt.gov.au/__data/assets/pdf_file/0011/254954/Short.pdf [Accessed 1 May 2018]. Northern Territory Herbarium (NTH). (2020). FloraNT - Northern Territory flora online. Department of Land Resource Management. [accessed 27 October 2020] Westaway, J. and Cowie, I. (2012). Threatened Species of the Northern Territory - *Cleome insolata*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0006/208428/cleome-insolata.pdf [Accessed 1 May 2018].			
an orchid *Crepidium marsupichila*	-	VU	**Habitat:** Prefers protected shady areas and moist soils rich in leaf litter along the margins of coastal dry monsoon rainforest and littoral rainforest (Kerrigan & Cowie 2006, FloraNT). **Distribution:** An Australian endemic with known populations from north-eastern Qld and the NT. In the NT, only known from one locality, Gunn Point (Kerrigan & Cowie 2006). Limited amount of recent survey in the area, though extensive surveys in the 1980's of rainforest areas failed to find the species (Kerrigan & Cowie 2006).	**NONE** • No monsoon rainforest or littoral rainforest habitat within the study area

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
	Kerrigan, R. and Cowie, I. (2006). *Threatened Species of the Northern Territory - Malaxis marsupichila*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0007/208690/malaxis-marsupichila.pdf [Accessed 1 May 2018].			
Darwin Cycad *Cycas armstrongii*	-	VU	**Habitat:** Open grassy woodland where adequate drainage appears to be a limiting factor (Kerrigan et al. 2006). Prime habitat has deep loamy soil (Liddle 2009). Separate male and female plants, with males flowering in August, and females from March-Nov (Holmes et al. 2007) **Distribution:** Restricted to the Top End of the NT – from Gunn Point to Hayes Creek, west to within 50km of the coastline and east to the Wildman River catchment (Kerrigan et al. 2006). Also on the Tiwi Islands and Cobourg Peninsula.	**LOW** • Study area located in the range of *Cycas armstrongii* • Specimens identified on site had predominantly *Cycas maconochiei* characteristics with some characteristics of *Cycas armstrongii* – thus hybrid *Cycas maconochiei x armstrongii*
	Holmes, J., Bisa, D., Hill, A. and Crase, B. (2007). *A Guide to the Threatened, Near Threatened and Data Deficient Plants in the Litchfield Shire of the Northern Territory*. WWF-Australia, Darwin. Kerrigan, R., Cowie, I. and Liddle, D. (2006). *Threatened Species of the Northern Territory - Cycas armstrongii*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0017/208430/cycas-armstrongii.pdf [Accessed 1 May 2018]. Liddle, D.T. (2009). Management Program for Cycads in the Northern Territory of Australia 2009-2014. Northern Territory Department of Natural Resources, Environment, the Arts and Sport, Darwin. http://www.territorystories.nt.gov.au/jspui/bitstream/10070/265358/1/Management%20program%20for%20cycads%20in%20the%20Northern%20Territory%20of%20Australia%202009%20to%202014.pdf [Accessed 1 May 2018].			
a ground orchid *Dienia montana*	-	VU	**Habitat:** Wet (spring-fed) rainforest (Kerrigan et al. 2013). **Distribution:** Northern Qld, and one population in the NT, near Munmarlary in Kakadu National Park. A targeted search in 2003 failed to record any plants at this locality (Kerrigan et al. 2013).	**NONE** • No wet rainforest in the study area
	Kerrigan, R., Cowie, I. and Ward S. (2013). *Threatened Species of the Northern Territory - Dienia montana*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0007/208474/dienia-montana-malaxis-latifolia.pdf [Accessed 1 May 2018].			
a sedge *Endiandra limnophila*	VU	VU	**Habitat:** Well-developed spring-fed rainforests on swampy or very wet substrates along creek margins (Kerrigan & Cowie 2006). **Distribution:** Endemic to Australia – far north of Cape York Peninsula in Qld, and the Tiwi Islands and Channel point in the NT (Kerrigan & Cowie 2006). In the NT, recorded at approximately 22 locations with no more than 6 individuals at any one locality (Liddle et al. 1994). Extensive survey of the Tiwi Islands in 2000-02 yielded no further populations (Woinarski et al. 2003).	**NONE** • No suitable wet habitat in the study area
	Kerrigan, R. and Cowie, I. (2006). *Threatened Species of the Northern Territory - Endiandra limnophila*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0003/208434/endiandra-limnophila.pdf [Accessed 1 May 2018]. Liddle, D.T., Russell-Smith, J., Brock, J., Leach, G.J. and Connors, G.T. (1994). *Atlas of the vascular rainforest plants of the Northern Territory*. Flora of Australia Supplementary Series No. 3, Australian Biological Resources Study, Canberra. Woinarski, J., Brennan, K., Cowie, I., Kerrigan, R., and Hempel, C. (2003). *Biodiversity conservation on the Tiwi islands, Northern Territory. Part 1. Plants and environments*. Department of Infrastructure Planning and Environment, Darwin.			
Narrow-leaf Climbing Pandan	-	VU	**Habitat:** Wet lowland rainforest and spring-fed rainforests in sandstone gullies (Kerrigan & Cowie 2006).	**NONE** • No rainforest within the study area

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
Freycinetia excelsa			**Distribution:** Known from Papua New Guinea, coastal Qld, and in the NT from seven locations between Bathurst Island and the Arafura Swamp (Kerrigan & Cowie 2006).	
	Kerrigan, R. and Cowie, I. (2006). *Threatened Species of the Northern Territory - Freycinetia excelsa*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0018/208440/freycinetia-excelsa.pdf [Accessed 1 May 2018].			
a herb *Goodenia quadrifida*	VU	-	**Habitat:** Ecology not well known. Recorded growing in grassland on the upper parts of estuarine floodplains on poorly-drained grey clays or silty soils (Cowie & Kerrigan 2006). Grows on cracking clay soils on plains (NTH 2020). Flowering and fruiting from March to May (Cowie & Kerrigan 2006). **Distribution:** Endemic to the Top End of the NT. Rare. Known from the upper Adelaide River and Hardies Creek (a tributary of the Mary River) (Cowie & Kerrigan 2006).	**NONE** • No estuarine floodplains in the study area
	Cowie, I. and Kerrigan, R. (2006). *Threatened Species of the Northern Territory - Goodenia quadrifida*. Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0006/376269/goodenia-quadrifida.pdf [Accessed 1 May 2018]. Northern Territory Herbarium (NTH). (2020). FloraNT - Northern Territory flora online. Department of Land Resource Management. [accessed 27 October 2020].			
a ground orchid *Habenaria rumphii*	-	EN	**Habitat:** Occurs in open forest and woodland, on poorly-drained sites which are partly inundated during the wet season. One NT collection was from a sandplain adjacent to the edge of a spring jungle. Flowers and fruits in Feb (NTH 2020). **Distribution:** Known from the northern parts of Australia, Papua New Guinea, and South-East Asia. Known in NT from the upper Howard River, south-east of Darwin, Litchfield NP and in the Wildman River area (DEPWS 2021).	**LOW** • Potentially suitable habitat in the study area • Very rarely detected in the NT
	Holmes, J., Bisa, D., Hill, A. and Crase, B. (2007). *A Guide to the Threatened, Near Threatened and Data Deficient Plants in the Litchfield Shire of the Northern Territory*. WWF-Australia, Darwin. Department of Environment, Parks and Water Security (2021). *Threatened species of the Northern Territory - Habenaria rumphii*. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0004/208444/habenaria-rumphii.pdf [Accessed 5 December 2022].			
a shrub *Helicteres macrothrix*	EN	EN	**Habitat:** Woodland dominated by *Eucalyptus tectifica, E. tetrodonta* and *E. miniata* on sandy loam and rocky siltstone slopes or granitic rocks (Cowie et al. 2012). Absent from the laterite country predominant in the region (DoE 2017). **Distribution:** Restricted to the Top End of the NT where only three populations known – Mt Bundey, Batchelor/Glenluckie Creek and Lake Bennett (DoE 2017). While it is possible that extensive targeted searches may uncover additional subpopulations, there is a high degree of confidence in the broader distributional data (Cowie et al. 2012).	**NONE** • Highly restricted range outside of study area
	Cowie, I., Kerrigan, R. and Stuckey, B. (2012). *Threatened species of the Northern Territory - Helicteres Sp. Glenluckie Creek*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0005/208445/helicteres-macrothrix.pdf [Accessed 1 May 2018]. Department of the Environment (2017). *Helicteres macrothrix*. Species Profile and Threats Database, Department of the Environment, Australian Government, Canberra. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=86586 [Accessed 28 April 2017].			
a shrub *Hibiscus brennanii*	VU	VU	**Habitat:** Sandstone cliffs, in gullies and on broken sandstone (Kerrigan & Cowie 2006).	**NONE** • No sandstone habitat within the study area

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
			Distribution: Endemic to the NT, with restricted population in the Mt Brockman area to the west of Arnhem Land (Kerrigan & Cowie 2006). Considered adequately surveyed (Kerrigan & Cowie 2006).	
	Kerrigan, R. and Cowie, I. (2006). *Threatened Species of the Northern Territory - Hibiscus brennanii*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0003/208452/hibiscus-brennanii.pdf [Accessed 1 May 2018].			
Luisia Orchid *Luisia corrugata*	-	VU	**Habitat:** An epiphyte that commonly grows on trees with scaly bark and prefers the areas of bright light (non-shaded area). Hosts trees include *Syzygium spp., Sterculia quadrifida, Barringtonia acutangula, Canarium australianum* and *Vitex spp.* (FloraNT). Collected from the margins of monsoon rainforests (DEPWS 2021). **Distribution:** Appears to be endemic to the NT with known populations from Melville Island and the mainland (Bankers Jungle and Crocodile Creek in Black Jungle Conservation Reserve) (DEPWS 2021).	**NONE** • No monsoon rainforest margins in the study area
	Department of Environment, Parks and Water Security (2021). *Threatened Species of the Northern Territory - Luisia corrugata*. [online] Available at: https://nt.gov.au/__data/assets/pdf_file/0005/208472/luisia-corrugata.pdf [Accessed 20 December 2022].			
Arrow-leaf Monochoria *Monochoria hastata*	-	VU	**Habitat:** Grows in floating mat vegetation in permanent to near-permanent back-swamps, drainage channels and billabongs (Kerrigan & Cowie 2006). Inflorescence of 25-60 flowers occurs from March-June, and capsule fruits from April-June (Holmes et al. 2007). **Distribution:** New Guinea, India, Sri Lanka, South-East Asia. In Australia, only found in the NT on the floodplains of the Finniss, Reynolds and Wildman Rivers (Kerrigan & Cowie 2006). There is a negative collection bias associated with the swampy habitat in which this species occurs. However, extensive coverage of floodplains in the Kakadu region detected this species at only one location in that region (Wildman River). Furthermore, it is considered that the extensive surveys of the Top End floodplain communities (Wilson et al. 1991) during the 1990s would have detected this species more often had it been more common or widespread (Kerrigan & Cowie 2006).	**NONE** • No suitable permanent freshwater habitat within the study area
	Holmes, J., Bisa, D., Hill, A. and Crase, B. (2007). *A Guide to the Threatened, Near Threatened and Data Deficient Plants in the Litchfield Shire of the Northern Territory*. WWF-Australia, Darwin. Kerrigan, R. and Cowie, I. (2006). *Threatened Species of the Northern Territory - Monochoria hastate*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0003/208479/monochoria-hastata.pdf [Accessed 1 May 2018]. Wilson, B.A., Brocklehurst, P.S. and Whitehead, P.J. (1991). *Classification, distribution and environmental relationships of coastal floodplain vegetation, Northern Territory, Australia*. Technical Report 91/2. Conservation Commission of the Northern Territory, Darwin.			
Darwin Palm *Ptychosperma macarthurii*	-	EN	**Habitat:** Dense rainforests fed from lowland springs at the edges of tropical riverine floodplains. Common in deep organic loamy clay substrates without humus development (Liddle et al. 2006). Flowers occur from May-Dec, and fruits from Aug-Sept and Nov-Dec (Holmes et al. 2007). **Distribution:** Known from the NT, Cape York Peninsula and Papua New Guinea. Within the NT, known from eight locations on the western margin of the Adelaide River Floodplain (Liddle et al. 2006). Survey effort is not documented, but is	**NONE** • No dense rainforest habitat within the study area

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
			unlikely that additional, undetected subpopulations exist in the Gunn Point study area (Stokeld et al. 2020).	
	Holmes, J., Bisa, D., Hill, A. and Crase, B. (2007). *A Guide to the Threatened, Near Threatened and Data Deficient Plants in the Litchfield Shire of the Northern Territory*. WWF-Australia, Darwin. Liddle, D.T., Brook, B., Matthews, J., Taylor, S.M. and Caley, P. (2006). Threat and response: A decade of decline in a regionally endangered rainforest palm affected by fire and introduced animals. *Biological Conservation*, Vol. 132, pp. 362-375.			
Trigger plant *Stylidium ensatum*	EN	EN	**Habitat:** Margins of drainage areas in damp heavy clay or peaty soil (Cowie & Westaway 2012). Occurs with sedges (e.g. *Fimbristylis furva*), perennial grasses such as *Eriachne burkittii*, herbs such as *Burmannia* spp. and shrubs such as *Osbeckia* spp. and scattered *Banksia dentata* (TSSC 2016). Associated with *Melaleuca viridiflora* and *Lophostemon lactifluus* (Holmes et al. 2007). Sites occupied are poorly drained sandy or loamy flats that are seasonally inundated and are damp well into the Dry season (June-Aug) (TSSC 2016). Flowering and fruiting June and July (Holmes et al. 2007; Cowie & Westaway 2012). **Distribution**: Known from three localities – Shoal Bay, Girraween Rd, Hayes Creek. Other historical collections recorded; however, the exact locality for these collections is unknown. Populations at Girraween Rd. and Hayes Creek still exist based on NT Herbarium surveys in recent years. Only additional subpopulation has been located on Koolpinyah Station near Gunn Point Rd., despite several flora and biodiversity surveys in the Darwin region over the last ten years (but no systematic survey of potentially suitable habitat at an appropriate time of year). Substantial areas of potentially-suitable habitat south from Darwin towards Hayes Creek that are relatively poorly surveyed and it is likely that additional subpopulations exist (Cowie & Westaway 2012).	**NONE** • Moderate suitability habitat modelled in the study area (Green and Cuff 2016). Found to be unsuitable during field verification.
	Cowie, I. and Westaway, J. (2012). *Threatened species of the Northern Territory - Stylidium ensatum*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0009/208494/stylidium-ensatum.pdf [Accessed 1 May 2018]. Green, C. and Cuff, N. (2016) *Threatened Species Distribution in the Greater Darwin Region – Stylidium ensatum*. Department of Land Resource Management. [online] Available at: http://www.ntlis.nt.gov.au/metadata/export_data?type=html&metadata_id=35A8F264A830E4BCE050CD9B214471C4 [Accessed 20 December 2022}. Holmes, J., Bisa, D., Hill, A. and Crase, B. (2007). *A Guide to Threatened, Near Threatened and Data Deficient Plants in the Litchfield Shire of the Northern Territory*. WWF-Australia, Darwin. Threatened Species Scientific Committee. 2016. Conservation Advice. Stylidium ensatum. Department of the Environment, Canberra.			
a herb *Typhonium praetermissum*	-	VU	**Habitat***:* Open woodland including relatively unshaded areas in red brown clay and shallow or gravelly lateritic soil (Cowie & Westaway 2012). **Distribution:** Endemic to the NT. Previous recorded at six locations in the Darwin/Litchfield area – Virginia, Karama, the Palmerston escarpment, Mandorah and Humpty Doo (Cowie & Westaway 2012). Two new sub-populations recorded in Lloyd Creek (EcOz records). Low number of fertile collections thought to be due to the species seasonality rather than its abundance. Targeted survey have been undertaken in the Darwin region in 2016 and additional sub-populations have been identified at both Gunn Point and the southern extent of Cox Peninsular (Cuff and Green 2019)	**LOW** • Small area (~0.9 ha) in the south-west of the study area modelled to have moderate likelihood of occurrence • Found to be unsuitable during field verification.

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
	Cowie, I. and Westaway, J. (2012). *Threatened species of the Northern Territory - Typhonium praetermissum.* Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0017/208502/typhonium-praetermissum.pdf [Accessed 1 May 2018]. Cuff, N. and Green, C. (2019) Threatened Species Distribution in the Greater Darwin Region – Typhonium praetermissum. Version 3.2. Department of Environment and Natural Resources. [online] Available at: http://www.ntlis.nt.gov.au/metadata/export_data?type=html&metadata_id=35A8F264A830E4BCE050CD9B214471C4 [Accessed 20 December 2022].			
a herb *Typhonium taylori*	EN	EN	**Habitat:** Seasonally-saturated sandy substrate in nutrient-deficient grass/sedge land (Kerrigan & Cowie 2006). **Distribution:** Endemic to the NT, with the only known population from the edge of the Howard River floodplain (Kerrigan & Cowie 2006). Targeted survey for this species in the Howard River Floodplain as part of a biodiversity assessment survey (Cowie 2002) did not relocate or uncover any additional populations of this species. Considered adequately surveyed, based on the strong survey effort in the area and the high profile of this genus amongst collectors. While more populations may exist, the paucity of collections of this species is considered to accurately reflect its very restricted distribution and abundance (Kerrigan & Cowie 2006).	**NONE** • No sandsheet heath habitat within the study area
	Cowie, I. D. (2002). *Preliminary report on a survey of Utricularia (Lentibulariaceae) in the Howard River – Shoal Bay area*. NT Department of Infrastructure Planning and Environment, Darwin. Kerrigan, R. and Cowie, I. (2006). *Threatened species of the Northern Territory - Typhonium taylori.* Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0019/208504/typhonium-taylori.pdf [Accessed 1 May 2018].			
a bladderwort *Utricularia dunstaniae*	-	VU	**Habitat:** 'Sandsheet heath' type habitats with wet sand, often in shallow water, in paperbark (*Melaleuca nervosa*) woodland or Feather-flower (*Verticordia*) shrub land. Occurs in slightly wetter micro-habitats than other sympatric *Utricularia* species, frequently where water is percolating from the ground (Kerrigan & Cowie 2015). **Distribution:** Endemic to Australia, known from WA and the NT – where known from nine locations. Locations near Darwin are Noonamah, Howard Springs and the Howard River floodplain. Other sub-populations on the Cobourg Peninsula, near Murgenella and near Finniss River (Kerrigan & Cowie 2015). As apparently suitable habitat within the extent of occurrence remains unsurveyed, it is likely that additional, undiscovered subpopulations exist (Kerrigan & Cowie 2015).	**NONE** • No sandsheet heath habitat within the study area
	Kerrigan, R. and Cowie, I. (2015). *Threatened Species of the Northern Territory - Utricularia dunstaniae*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0020/208505/utricularia-dunstaniae.pdf [Accessed 1 May 2018].			
a bladderwort *Utricularia singeriana*	-	VU	**Habitat:** Borders of seasonally-inundated grassland (Cowie & Kerrigan 2012) and low open woodland (Holmes et al. 2005). Dominant associated plants include *Eriachne burkittii*, *Sorghum* spp., *Pseudopogonatherum* spp. and sedges (Cowie & Kerrigan 2012). Also recorded growing near granite outcrops (Holmes et al. 2005). Often in shallow water (to 2 cm deep) on moist sandy or sandy loamy substrates (Holmes et al. 2005). Flowering between March and May, and fruiting begin in May (Cowie & Kerrigan 2012). **Distribution**: Endemic to the NT with known populations from five locations between Darwin and Katherine – the nearest to Darwin being Finn Rd in Weddell.	**NONE** • No sandsheet heath habitat within the study area

Name	Status		Summary	Likelihood of occurrence
	Cth	NT		
			Other sites are the Edith River area, near the Finniss River, and the Marrawal Plateau east of Pine Creek. Port Darwin population (early 1900's record) no longer in existence (Kerrigan & Cowie 2012). As much apparently suitable habitat within the extent of occurrence remains unsurveyed, it is likely that additional undiscovered sub-populations exist (Cowie & Kerrigan 2012).	
	Cowie, I. and Kerrigan, R. (2012). *Threatened Species of the Northern Territory - Utricularia singeriana.* Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0003/208506/utricularia-singeriana.pdf [Accessed 1 May 2018]. Holmes, J., Bisa, D., Hill, A. and Crase, B. (2005). *A Guide to Threatened, Near Threatened and Data Deficient Plants in the Litchfield Shire of the Northern Territory*. WWF-Australia, Sydney.				
a ground orchid *Zeuxine oblonga*	-	VU	**Habitat:** Grows in clusters in dark and moist situations in wet rainforest or in wet peaty areas near streams (Jones 1988). **Distribution:** Qld, NSW and in the NT, where known from five widely-spaced locations south and south-west of Darwin, from Keep River near the WA border to south-west of Adelaide River (Liddle et al. 1994). Not collected since 1992, despite efforts to relocate the Keep River population in 2000 and 2001 (Kerrigan & Cowie 2006). There is a negative collection bias associated with this species due to its ephemeral nature.	**NONE** • No wet rainforest habitat within the study area
	Jones, D.L. (1988). *Native Orchids of Australia*. Reed, Sydney. Kerrigan, R. and Cowie, I. (2006). *Threatened Species of the Northern Territory – Zeuxine oblonga*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0008/208691/zeuxine-oblonga.pdf [Accessed 1 May 2018]. Liddle, D.T., Russell-Smith, J., Brock, J., Leach, G.J. and Connors, G.T. (1994). Atlas of the vascular rainforest plants of the Northern Territory. *Flora of Australia Supplementary Series No. 3*, Australian Biological Resources Study, Canberra.			

APPENDIX D CAMERA TRAPPING SITE LOCATIONS

Site	Camera	Distance to bait station (cm)	Latitude	Longitude
CT02	1	65	12.745537	130.790594
	2	250	12.746162	130.790854
	3	150	12.746477	130.790885
CT03	1	65	12.742288	130.789716
	2	150	12.740102	130.784968
	3	250	12.740922	130.785344
CT04	1	250	12.736795	130.791356
	2	65	12.737329	130.781796
	3	150	12.737703	130.792342
CT05	1	250	12.734130	130.784143
	2	65	12.734074	130.784605
	3	150	12.734097	130.785033
CT08	1	65	12.736407	130.799809
	2	250	12.736696	130.799764
	3	150	12.736022	130.799945
CT09	1	65	12.736382	130.807010
	2	150	12.737105	130.807110
	3	250	12.737521	130.806.982

APPENDIX E SPECIES DETECTED BY REMOTE CAMERA TRAPS

Rows highlighted in yellow denote listed threatened species

Common Name	Scientific Name	Class	Status	Cameras
Agile Wallaby	*Notamacropus agilis*	Mammal	Native	CT05 C1, CT08 C1, CT08 C3, CT09 C2, CT09 C3
Black-footed Tree-rat	*Mesembriomys gouldii gouldii*	Mammal	Threatened	CT03 C1, CT03 C3, CT04 C3, CT08 C1, CT08 C3, CT09 C2, CT09 C3
Cat	*Felis catus*	Mammal	Introduced	CT04 C1, CT05 C3, CT08 C1, CT08 C2
Common Brushtail Possum	*Trichosurus vulpecula arnhemensis*	Mammal	Threatened	CT02 C1, CT03 C1, CT03 C2, CT04 C1, CT04 C3, CT05 C2, CT05 C3, CT08 C1, CT08 C3, CT09 C2, CT09 C3
Dingo	*Canis familiaris dingo*	Mammal	Native	CT03 C3, CT04 C1, CT05 C2, CT08 C2
Northern Brown Bandicoot	*Isoodon macrourus*	Mammal	Native	CT03 C1, CT03 C2, CT03 C3, CT04 C1, CT04 C3, CT05 C1, CT05 C2, CT05 C3, CT08 C1, CT08 C2, CT08 C3, CT09 C2, CT09 C3
Pig	*Sus scrofa*	Mammal	Introduced	CT03 C1, CT03 C3, CT09 C2
Red-cheeked Dunnart	*Sminthopsis virginiae*	Mammal	Native	CT02 C1, CT08 C2, CT09 C2
Spotted Tree Monitor	*Varanus scalaris*	Reptile	Native	CT08 C1

APPENDIX F CAMERA SITE HABITAT ASSESSMENT

Site: CT01 and CT02			
Date: 14/6/23			
Location: 72.746079, 130.790810			
Overall Description: Mid open woodland, riparian drainage area with juvenile pandanus			
Disturbance			
Fire	Very recent		
Weeds	None observed – likely but burnt		
Feral animals	No evidence or presence		
Strata	**Dominant species**	**Height range (m)**	**Cover (%)**
Upper	*Eucalyptus tetrodonta* *Eucalyptus miniata* *Erythrophleum chlorostachys*	10-13 10-13 10-12	5 5 5
Mid	*Petalostigma pubescens* *Livistona humilis* *Pandanus spiralis*	2-6 6 6	12 10 5
Ground	*Pandanus spiralis* No ID – recent fire		15
Flowing or fruiting plants: *Livistona humilis, Grevillea pteridifolia*			

Large tree presence	**>30cm**	**>40cm**	**>50cm**
	2	2	1
Tree hollow presence	**<10cm**	**10-20cm**	**>20cm**
	-	2	-

Site: CT03			
Date: 14/6/23			
Location: 12.740574, 130.785101			
Overall Description: Open eucalyptus forest on low gentle slope			
Disturbance			
Fire	Burnt last year		
Weeds	None observed		
Feral animals	No evidence or presence		
Strata	**Dominant species**	**Height range (m)**	**Cover (%)**
Upper	*Eucalyptus tetrodonta* *Eucalyptus miniata* *Erythrophleum chlorostachys*	12-15 10-13 8-10	10 10 3
Mid	*Livistona humilis* *Grevillea pteridifolia* *Terminalia ferdinandiana*	2-5 2-6 8-10	10 5 2
Ground	Grass sp. *Sorghum* sp.		50 20
Flowing or fruiting plants: *Eucalyptus sp., Livistona humilis, Grevillea pteridifolia*			

Large tree presence	**>30cm**	**>40cm**	**>50cm**
	few	1	1
Tree hollow presence	**<10cm**	**10-20cm**	**>20cm**
	Many	Few	1

Site: CT04			
Date: 14/6/23			
Location: 12.736186, 130.791486 OR			
Overall Description: Open woodland over rocky slope, surface gravel and dense grass cover			
Disturbance			
Fire	Burnt last year		
Weeds	None observed		
Feral animals	No evidence or presence		
Strata	**Dominant species**	**Height range (m)**	**Cover (%)**
Upper	*Eucalyptus miniata* *Eucalyptus tetrodonta* *Corymbia bleeseri*	12-17 12-17 10-12	10 10 2
Mid	*Erythrophleum chlorostachys* *Livistona humilis* *Grevillea decurrens*	4-8 1-4 1-3	5 5 5
Ground	Grass sp. *Sorghum* sp.		50 20
Flowing or fruiting plants:			

Large tree presence	**>30cm**	**>40cm**	**>50cm**
	10	few	1
Tree hollow presence	**<10cm**	**10-20cm**	**>20cm**
	Many	Few	1

Site: CT05			
Date: 14/6/2023			
Location: 12.733980, 130.784127			
Overall Description: Low-mid open woodland over sandy clay soil			
Disturbance			
Fire	Very recent		
Weeds	None observed		
Feral animals	Pig and cattle evidence but not recent		
Strata	**Dominant species**	**Height range (m)**	**Cover (%)**
Upper	*Erythrophleum chlorostachys* *Alstonia actinophylla* *Owenia sp*	8-10 8-10 7-8	5 1 1
Mid	*Livistona humilis* *Terminalia ferdinandiana* *Pandanus spiralis*	1-4 2-6 4-6	10 5 1
Ground	*Sorghum sp.* *Grass species*		30 10
Flowing or fruiting plants: *Grevillea pteridifolia, Livistona humilis*			

Large tree presence	**>30cm**	**>40cm**	**>50cm**
Tree hollow presence	**<10cm**	**10-20cm**	**>20cm**
	-	-	-

Site: CT08 A			
Date: 11/05/23			
Location: 12.736218, 130.799937			
Overall Description: Edge of Eucalyptus woodland rocky rise			
Disturbance			
Fire	Burnt last year		
Weeds	None observed		
Feral animals	No evidence or presence		
Strata	**Dominant species**	**Height range (m)**	**Cover (%)**
Upper	*Eucalyptus miniata* *Eucalyptus tetrodonta* *Eucalyptus sp.*	10-15 10-15 9-10	15 4 1
Mid	*Livistona humilis* *Erythrophleum chlorostachys* *Terminalia ferdinandiana*	6-8 1-5 6-8	5 5 <1
Ground	*Sorghum sp.* *Heteropogon triticeus* *Grass sp.*		15 15 5
Flowing or fruiting plants: *Livistona humilis, Terminalia ferdinandiana*			

Large tree presence	**>30cm**	**>40cm**	**>50cm**
	Few	-	-
Tree hollow presence	**<10cm**	**10-20cm**	**>20cm**
	Few	Few	-

Site: CT08 B			
Date: 11/05/23			
Location: 12.736690, 130.799544			
Overall Description: Edge of Eucalyptus woodland drainage line with lower vegetation			
Disturbance			
Fire	Burnt last year		
Weeds	None observed		
Feral animals	No evidence or presence		
Strata	**Dominant species**	**Height range (m)**	**Cover (%)**
Upper	*Erythrophleum chlorostachys* *Lophostemon lactifluus* *Eucalyptus sp.*	6-8 4-6 4-6	5 4 <1
Mid	*Livistona humilis* *Grevillea pteridifolia* *Pandanus spiralis*	1-4 1-6 1-4	3 1 <1
Ground	*Grass sp.* *Sorghum sp.* *Grass sp.*		20 10 5
Flowering of fruiting plants: *Livistona humilis*			

Large tree presence	**>30cm**	**>40cm**	**>50cm**
	1	-	-
Tree hollow presence	**<10cm**	**10-20cm**	**>20cm**
	-	-	-

Site: CT09			
Date: 11/05/23			
Location:	12.737105, 130.807152		
Overall Description: Adjacent to mine to north-east, lower drainage country to south-east, east end field area, north of Fog Bay road, woodland on rocky slope.			
Disturbance			
Fire	Burnt last year		
Weeds	None observed		
Feral animals	No evidence or presence		
Strata	**Dominant species**	**Height range (m)**	**Cover (%)**
Upper	*Eucalyptus miniata* *Eucalyptus tetrodonta* *Corymbia bleeseri*	10-15 10-15 10-15	15 15 2
Mid	*Erythrophleum chlorostachys* *Livistona humilis* *Terminalia ferdinandiana*	4-8 1-4 5-6	5 5 <1
Ground	*Heteropogon triticeus* *Sorghum species* *Grass sp.*		10 10 5
Flowering of fruiting plants: *Livistona humilis, Terminalia ferdinandiana*			

Large tree presence	**>30cm**	**>40cm**	**>50cm**
	1	1	-
Tree hollow presence	**<10cm**	**10-20cm**	**>20cm**
	few	few	-

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